

AMERICAN ARTISAN

WARM AIR HEATING • SHEET METAL
CONTRACTING • AIR CONDITIONING



ABLISHED
8 8 0

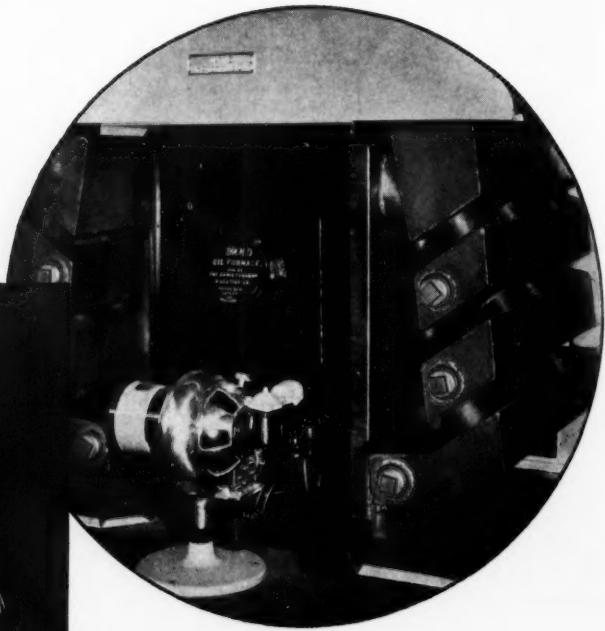
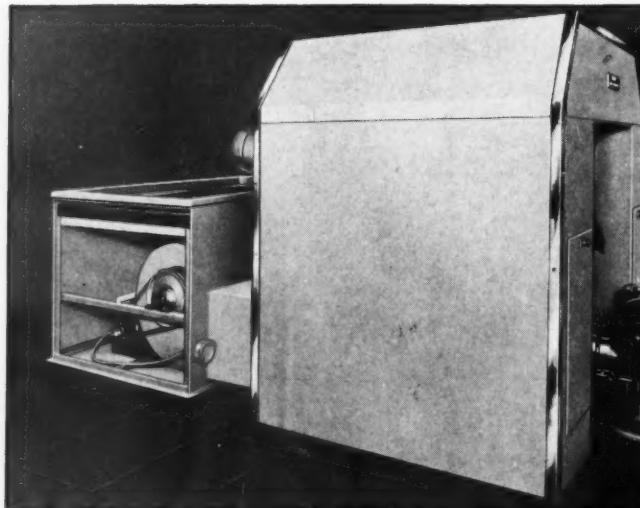
PRIL
935

THE AIR CONDITIONING SECTION

Page 23

AMERICAN ARTISAN

It's So Easy to Fabricate



... and it has other Advantages

When the Bryan Plumbing & Heating Company, Bryan, Ohio, designed the efficient furnace that bears its name, the selection of Toncan Iron for the sheet metal parts was due to two of its inherent qualities.

In the first place, records of experience proved that the ease with which it can be fabricated resulted in production cost savings that more than counteracted its slightly higher cost. It is easy to cut, bend, draw and weld.

Then, again, it built honest value into the product and gave the user something that he could not see, but that became more and more tangible with the passing

years of service—years of longer life. That is because this modern alloy of refined open hearth iron, copper and molybdenum possesses the highest rust-resistance of any ferrous metal in its price class.

The demand for Toncan Iron for sheet metal equipment increases as its qualities become better known. Try it where ordinary sheet metal has proved short-lived. Compare the service. And find out just how easily it does work up on intricate jobs.

Let us send you a copy of "The Path to Permanence." It's full of information and ideas for the sheet metal contractor and fabricator and well worth writing for.



Republic Steel CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO

630,000

cubic feet
per hour



\$132⁰⁰

Retail Price
Complete in cabinet 48" x 48" x 24"

GIANT Nite Fan

TRADE-MARK

ONLY HOLD-HEET
HAS THESE
EXCLUSIVE FEATURES

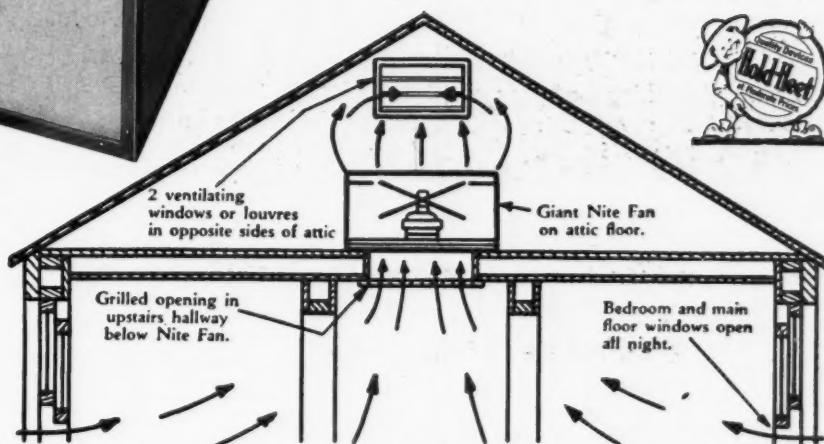
1 ENORMOUS CAPACITY. 10,500 cubic feet per minute give the 20 complete air changes per hour that are necessary for effective results.

2 NOISELESS. Blower blades operate at 530 r.p.m.—below audible frequency. No high speed motor hum.

3 FINEST MOTOR. Direct-connected, 12-pole, $\frac{1}{3}$ h.p., vertical CAPACITOR MOTOR. Do not compare with cheap belt-driven units.

4 EFFICIENT AND LONG-LIVED. Low starting current, high power factor, 10-year lubrication.

RUSSELL ELECTRIC COMPANY, Mfrs., 342 W. Huron St., Chicago



Cools the Entire House at Low Cost

SUMMER COOLING of the entire house at the rate of 20 domestic electric refrigerators, at an operating cost of $1\frac{1}{2}$ c per hour while running.

HEALTHFUL COOLING that gives daytime household temperatures from 12 to 15 degrees below the outdoor maximum. RELATIVE COOLING free from the dangers and discomforts of refrigerator-to-oven methods. Home cooling that everyone will want; that most homeowners can afford.

MAKE THIS SUMMER YOUR BIG SEASON. Today's market for night fans is comparable with the market you would find for furnaces if suddenly every house was without a central heating plant.

The Coupon Brings All This Information

1 Digest of University of Illinois research on cooling with night fans.

2 Blueprints showing variation of performance with number of air changes.

3 Catalog of complete line of air conditioning equipment for the home, with units for use with each type of central heating plant.



PIN THIS COUPON TO YOUR LETTERHEAD

Russell Electric Company, Mfrs.,
342 W. Huron Street, Chicago, U. S. A.

() Send Catalog and Sales Manual on the Hold-Heet 4-Unit Plan of Air Conditioning with full information on the Giant Nite Fan.
() Send dealer price list—(NOTE—only mailed when your stationery or a full explanation shows you are entitled thereto.)

Signed

Firm Name

Street Address

City..... State.....

Preferred Jobber.....

Covering All Activities
in
Gravity Warm Air Heating
Forced Warm Air Heating
Sheet Metal Contracting
Air Conditioning
Ventilating
Roofing



Published Monthly by
Keeney Publishing Company
6 North Michigan Ave., Chicago
State 6916

Branch Offices

New York
Room 1735
Grand Central Terminal Bldg.
Murray Hill 2-8293

Cleveland
2047 Rossmoor Rd.
Cleveland Hts.
Yellowstone 1540

J. D. WILDER
Editor

Advertising Staff

WALLACE J. OSBORN
R. PAYNE WETTSTEIN
ROBERT A. JACK

Copyright 1935 by

Keeney Publishing Company

F. P. KEENEY
President

W. J. OSBORN
Vice President

R. PAYNE WETTSTEIN
Secretary

CHAS. E. PRICE
Treasurer

Member of Audit Bureau of Circulations
Member Associated Business Papers, Inc.

Yearly Subscription Price—U. S. and pos-
sessions, \$2.00; Canada, \$3.00; Other coun-
tries, \$4.00. Single copies, \$.25. Back num-
bers \$.50. Entered as second-class matter,
July 29, 1932, at the Post Office at Chicago,
Illinois under the act of March 3, 1879.

AMERICAN ARTISAN

With which is merged

FURNACES
SHEET METALS

AND

Warm-Air
Heating

Vol. 104, No. 4

April, 1935

Founded 1880

CONTENTS

The Sheet Metal-Roofing Conference.....	11
A detailed report of the election, addresses, discussions, business transactions of the joint conference of our industry in Cincinnati.	
Material Size Separation with Exhaust Systems.....	15
The separation of heavier-than-air materials is oftentimes a problem where the separation must be made in the exhaust system. J. W. Baybutt shows some practical methods.	
Grave Vaults, Clothes Dryers—Fabricated by a Sheet Metal Shop	16
A Milwaukee, Wis., sheet metal shop developed a steady production of these items and found the work filled in slack hours. We describe the production methods.	
Field Test of a Forced Air System.....	18
As a part of American Artisan's winter testing program several houses scattered around the country were selected and the system installed was field tested to secure actual operating results. We tell what the system was supposed to do and what it actually did.	
The New York State Association Annual Convention.....	21
Report of the mail order discussion, also other addresses, business transactions of the lively meeting held in Rochester.	
The Air Conditioning Section.....	23
Summer Cooling in a Detroit Residence.....	27
The first article in a series presenting practical facts about cooling. This test house uses mechanical refrigeration and the author gives all the data about the design, operation and cost. Many common cooling questions are answered.	
Automatic Controls for Air Conditioning Systems.....	29
We conclude the discussion of a zone control system for hand firing. Diagrams show some typical wiring arrangements and the text contains a resume of the features of zone operation and control.	
Comparative Input of Coal, Oil, Gas in Terms of Therms....	31
An American Artisan Data Sheet showing in terms of various equipment efficiencies how much coal, oil, gas is required in comparison to the fuel in use.	
Registers For Forced Air Installations.....	32
S. Konzo continues his series on Forced Air Heating Facts and presents in this issue a valuable summary of where to place registers; how location effects air movement; also what velocities are permissible; what floor temperatures can be expected. One of the best articles published in many months.	
The Problem Corner.....	47
Some answers to last month's problems. Also several new problems for your consideration.	
Association Activities	49
Association activities are on the increase. Many associations are in the midst of outstanding programs. We report numerous activities from all parts of the country.	
Code Authority Reports.....	51
We present a resume of the bid depository plan now in use throughout New York State.	
New Products	52
News Items	56
New Literature	58
With The Manufacturers.....	61

More than 7,000 copies of this issue are being distributed.



• A combination of handsome appearance and high efficiency, the Sunbeam Cast Furnace . . . Square casings in crystalline baked enamel, as illustrated, or in galvanized iron, are available.

NOW..

you can obtain

SUNBEAM

WARM-AIR FURNACES

in colorful, attractive square casings

SUNBEAM Furnaces, both cast iron and steel, have long been recognized as the standard of comparison in the warm air heating industry. In design and construction, durability and capacity, efficiency and dependability, this complete line of heating equipment, with all the refinements and superiorities that the resources and facilities of the world's largest heating equipment manufacturers could suggest or provide, has for the past 50 years established a well-merited reputation for possessing the qualities which heating plants of the highest calibre must have. And now to all of the Sunbeam mechanical advantages is added the advantage of eye appeal! Different, distinctive appearance! Bright, inviting color! One of these furnaces will enhance the attractiveness of the most tastefully arranged display room.

You should have prices on these heating plants so that you can quote prospects who want something different—something suitable in appearance for a modernized basement. The coupon will bring this information; also the name of a Sunbeam Jobber who is located nearby, and complete details of the Sunbeam Finance Plan in connection with Federal Housing Administration.



This illustration shows a Sunbeam Steel Furnace with square enameled casing and pitch top hood. Sunbeams can also be obtained with straight side, flat top hoods.

THE FOX FURNACE CO.
ELYRIA, OHIO

A Division of

AMERICAN RADIATOR & STANDARD SANITARY CORP.

The Fox Furnace Co., Elyria, Ohio

Please send descriptive literature on the Sunbeam Furnace with colored, square casings. At the same time tell us about the Sunbeam Finance Plan in connection with Federal Housing Administration and give us the name of the nearby jobber who serves our locality.

Name.....

Address.....

City and State.....

A-4

AMERICAN

STEEL SHEETS FOR EVERY PURPOSE



— Write for Literature and Complete Information —

American Sheet and Tin Plate Company

GENERAL OFFICES: Frick Building, PITTSBURGH, PA.

STEEL SHEETS ALSO PRODUCED

In the South by TENNESSEE COAL, IRON & RAILROAD CO.
Birmingham, Ala.

On the Pacific Coast by COLUMBIA STEEL COMPANY
San Francisco, Calif.

Export Distributor for above Companies — UNITED STATES STEEL PRODUCTS COMPANY, Hudson Terminal Building, 30 Church Street, NEW YORK, N. Y.

United States Steel Corporation Subsidiaries



"SITTING PRETTY" for '35

All the selling odds are in your favor—with MMFP (Mueller-Milwaukee Finance Plan) and FHA as a solid basis to work on.

The no-money-now bugbear is removed by MMFP, offering Three Years to Pay—No Down Payment—Moderate Interest—No Mortgage or Red Tape.

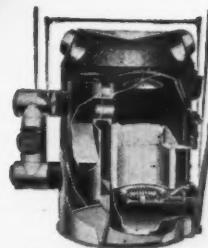
You get your money right away—you simply endorse the customer's note WITHOUT RE COURSE—you incur no financial responsibility.

In the Complete Mueller Line you have every type of equipment you need—under a brand name that means Quality to the customer. Liberal terms on stock or display items.

Write for full details on this winning combination.



L. J. MUELLER FURNACE CO.
Dept. AA-4, Milwaukee, Wis.
Branches and distributors in key cities everywhere



All-Steel Furnace
Mueller all-steel, riveted and welded furnaces for coal or oil burner—seven sizes, 20 to 34 inch drums. Including Giant Radiator type. Dome protected by cast iron bell.



Mueller "A" Series
—all cast iron—for those who want the best in a coal or oil burning unit. Seven sizes—20 to 33 inch firepots. Also available with round galvanized castings.



Mueller "F" Series
Mueller Full Front Furnace for volume business. Made in six sizes, both single and double door types. It's heavier—has higher "Standard Code" ratings—yet no higher in price. Also available in pipeless, three-way and room heater types.

MUELLER—MILWAUKEE

FIRELINE

every furnace

**--an opportunity
for unusual profits**

**READ this advertisement carefully.
It can mean a lot to you.**

AFTER 20 YEARS of experience in the manufacture of refractory materials, 20 years of specialization and development, we announce FIRELINE and with it a great opportunity for every heating contractor.

In industry where firing efficiency and heat delivery are carefully checked, firepots are refractory lined. It has long been established that only a lined firepot can get full value from any fuel. Domestic furnace manufacturers too recognized this fact, but until FIRELINE have lacked a satisfactory refractory material, practical for general domestic use.

With the development of FIRELINE, the entire heating picture is changed. Here at last is a firepot lining that: anyone can install; that conforms to any shape—handles all types, makes and models; all furnaces, stoves, ranges, boilers and heaters; a material that stands up under high temperatures (3,000 F.)—will not crack, fuse or spall; a firepot lining that will withstand shock and abrasion, "shaking" and "poking" . . . that has sufficient tensile strength to permanently and safely repair cracked, broken and burned-out firepots.

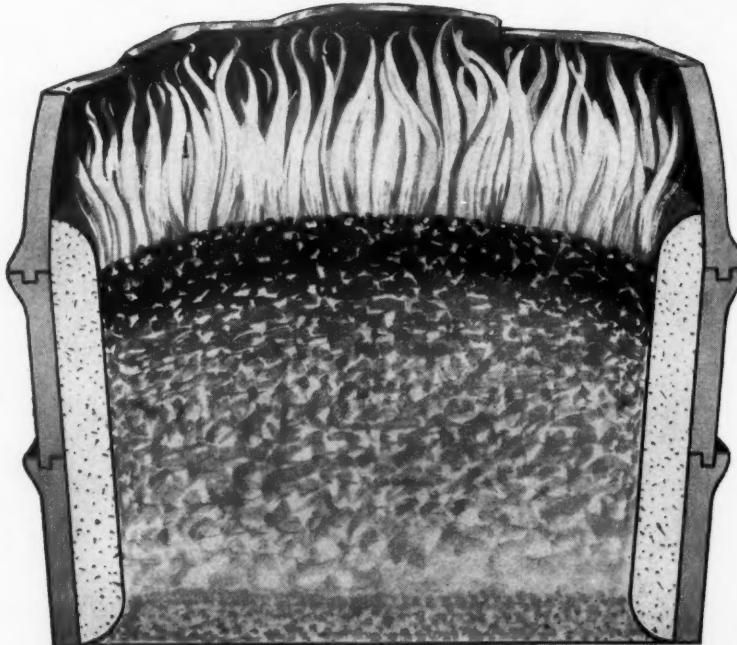
MORE Heat LESS Ash, Smoke, Soot

Everybody wants more heat, fewer ashes, less smoke and soot. FIRELINE will give all these with any fuels. It makes every homeowner an immediate prospect for your service. Realize



FIRELINE STOVE & FURNACE LINING CO., CHICAGO

Copyright 1935, Fireline Stove & Furnace Lining Co.



what this means to you: Unlimited business—every firepot in your territory represents a potential profit (a large material profit and a *larger labor profit*). Think what it means to your customers: Lower fuel bills. Increased heating capacity. Cleaner heat. Less drudgery. . . . Economy, Convenience, Safety. Every firepot you FIRELINE will bring you more business, will

**Repairs
Cracked
and
Broken
Firepots
in a few
hours**



—90% of the time it is not even necessary to take down the furnace.



sell other jobs. Once introduced FIRELINE is epidemic, it spreads from house to house, from neighborhood to neighborhood.

How FIRELINE Works

FIRELINE is plastic. It comes properly mixed, ready for use. It is applied one or two inches thick over inside of firepot from grates to fuel line. Once installed, it is ready to "burn in" . . . just build a fire in the usual way.

Without a refractory lining, the firepot walls being metal dissipate heat rapidly, reducing the temperature of the adjacent fuel below the efficient combustion point. This results in a band of border fuel from 2 to 4 inches wide that is

never completely burned—the volatile portion of this fuel is "cooked" out, goes up the chimney as smoke or soot, and much of that which remains finds its way to the ash pit but partly burned. This waste is eliminated with FIRELINE. Heat is refracted from FIRELINE to build more intense temperatures and the fuel bed burns red from wall to wall. Smoke and soot are consumed, are turned into HEAT, and ash is reduced to from 8 to 12 per cent of the original weight (of coal).

Though slightly decreasing the diameter of the firepot, FIRELINE increases its heat producing capacity. It is the easiest solution of the under-capacity problem. In every way FIRELINE steps up plant performance and cuts heating costs.

NOW IS THE TIME

to cash in on this new business builder—to talk, sell and install FIRELINE. Put it in every furnace and boiler you service. Use it as a "door opener" in soliciting other work. There's an unlimited amount of business repairing cracked or burned out firepots. Don't wait for new castings when you can permanently repair the old one with FIRELINE—can do it in half the time, make an equal profit, and give your customer a better heating plant. Start after this business now and you'll have a busy summer. Tell every regular customer about it and they'll sell the rest for you. (Remember FIRELINE is backed and guaranteed by a AAAI manufacturer). Be first—the FIRELINE Headquarters. Send for a Free Sample of this remarkable material, for sales helps, prices, discounts and installation data. Just pin the coupon to your letterhead and mail it now.

FREE SAMPLE COUPON

**Fireline Stove & Furnace Lining Co.
1200 Clay Street, Chicago, U. S. A.**

Gentlemen:

I'm willing to be shown. Mail me a Free Sample of FIRELINE with prices, discounts, installation data and description of your sales helps.

Signed _____

Firm _____

Address _____

City _____ **State** _____

Name of Preferred Jobber _____



Business for You

IN THE N. H. A. PROGRAM



Sheet metal work in this condition—your opportunity to sell copper

THE NATIONAL HOUSING ACT has already stimulated modernization and new home building. And, this year, activity in the construction industry promises to hit its stride.

A building revival means opportunity for you. It will be easier for you to *get your share* of the business if you recommend and push the sale of durable materials such as Anaconda Copper.

The trend today is toward longer term mortgages. It is obviously wasteful to borrow long term money to pay for short-lived materials. This provides *you* with an unusual opportunity to profit from quality construction with lasting

materials. Successful contractors have told us time and again that Anaconda Copper is easier to sell than other brands because it represents known value...and is accepted everywhere as the standard of sheet metal quality. Leading sheet metal supply houses carry Anaconda Copper in sheets and rolls, and copper gutters, leaders, elbows and shoes trademarked ANACONDA.

THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities

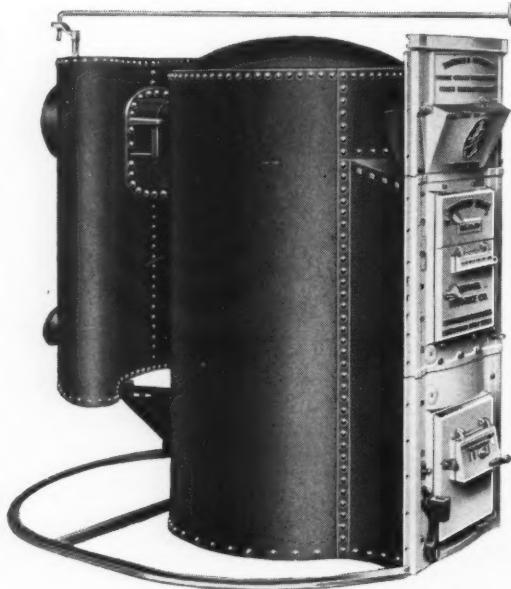
ANACONDA COPPER



LENNOX

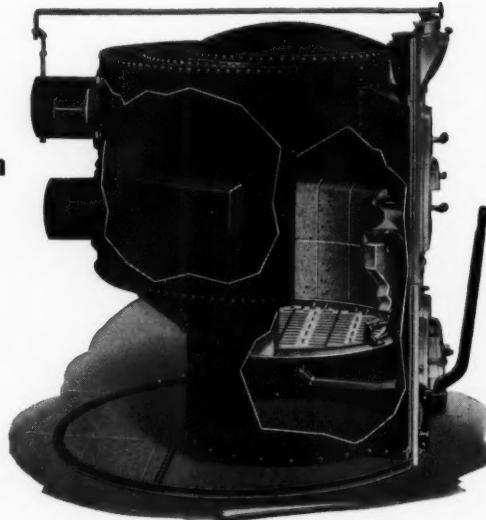
TORRID ZONE FURNACES

The Aristocrat of All Warm Air Furnaces



**Riveted
Steel
Construction**

**GAS
TIGHT**



SOFT COAL MODEL

This is the standard Torrid Zone designed primarily for burning any grade of soft coal. Note the tremendous area of effective steel heating surface with long self-cleaning smoke travel in radiator—the large double feed doors—lazy shaker device—direct draft damper and large humidifier. These are just a few of the many features of the Torrid Zone that assures the home owner the maximum in comfort and efficiency.

SPECIFICATIONS

Furnace Number	Htg. Surf. Sq. In.	Body Diam.	Std. Code Rating
50-22	6846	22"	515
50-24	7674	24"	600
52-27	8977	27"	746
52-29	9706	29"	845
54-32	10712	32"	1011
54-35	11061	35"	1175

HARD COAL MODEL

The HC Model Torrid Zone is designed for burning hard coal, coke or oil. The extreme Horse Shoe Radiator supplies the long smoke travel needed for maximum efficiency with these fuels. The direct draft damper is operated from the front of furnace. This model also has all the other prominent features which are characteristic of the De Luxe Torrid Zone.

SPECIFICATIONS

Furnace Number	Htg. Surf. Sq. In.	Body Diam.	Std. Code Rating
50-22-HC	7960	22"	551
50-24-HC	8252	24"	621
52-27-HC	9735	27"	787
52-29-HC	10102	29"	857
54-32-HC	13402	32"	1100
54-35-HC	13985	35"	1245

The Lennox Line also includes the "Oilfyre" for burning oil, The "Equator Gas", The Wood Burning Furnace, and the "Heavy Duty" Torrid Zone—in fact, a Lennox Furnace is available for every installation irrespective of the type of fuel or size of the job. A complete line of modern winter air conditioning equipment is also a part of the Lennox line of equipment.

THE LENNOX FURNACE COMPANY, INC.

WORLD'S LARGEST MANUFACTURERS OF STEEL FURNACES

MARSHALLTOWN, IOWA

SYRACUSE, NEW YORK

Volume 104



Number 4

AMERICAN ARTISAN

The Sheet Metal—Roofing Conference

THE third annual joint conference of the roofing, sheet metal and warm air heating contractors and the second National Code Authority election for Division 7 has passed into history. It was a hard working conference; with many discouraged members to re-vitalize, with numerous troubles to work out; with a discouraging amount of support from the industry as a whole.

Despite these handicaps a new National Code Authority was elected, definite solutions to some mighty tough problems were worked out, old-timers and many new and younger men were assembled into functioning units. The attendance was disappointing, but those who came, came to work; hence the accomplishments.

Opening the extensive program, Edwin A. Scott, Sheet Metal Worker, discussed the subject "The Trade Association in Industry." Said Mr. Scott—"There has never been a time when organization is so badly needed as right now. A very pertinent question at this thirty-first convention is—'What has this association done during its thirty years of life?

"There are nine projects we can point to as things we might have done, but didn't. These are—

"1—We have the Standard Code, but we have not pushed its adoption into local ordinances.

"2—Compensation insurance rates are inequitable, but can be corrected and made favorable by applying some organized pressure.

Highlights

If the conference is any criterion, the industry doesn't want a code.

We have elected 12 men, whose duty it will be to SELL the code to the industry.

If 25,000 firms have to be SOLD this idea by 12 men, we might as well throw the code out of the window.

At the outside, there can't be more than 15 per cent of the shops in Zone 11, yet 85 per cent of the votes cast came from this area.

Two things seem likely to kill the code—The endless amount of red tape which surrounds every item in the code structure and, second, the jellyfish attitude of Washington when it comes to making the teeth bite.

Chicago again protested emphatically, persistently, but only got tangled in the red tape.

The re-roofers, via Tobin, protested everything and anything.

Reports emanating from Washington tell us of code arguments where good old army fighting words are bandied about—ours was comparatively mild—closed corporation, rats, chiselers, steam rollers, being about as fighting as any.

Entire states, whole areas, did not send a single representative, nor cast a vote. Some of these areas are among the most important in the country.

The sheet metal contractors voted to hold their next convention by themselves; to devote more time to our problems, not someone else's.

National code authority expenses last year were \$64,000. Total income from assessments was \$34,000—leaving a deficit of \$30,000 with which to start the new year.

National code committeemen reported traveling thousands of miles at their own expense carrying the message of code compliance. No industry ever had a more loyal, devoted, unselfish body than ours, for they won't get paid back.

The National Sheet Metal Contractors Association gave George Harms all books, tracings, plates and copyright to Standard Practice in Sheet Metal Work and thereby writes off its debt of \$18,000.

"3—Such irregularities as the Ohio ventilation law can be straightened out to bring us business if we will all fight together.

"4—The industry needs a uniform cost accounting system, but we will never get it until we all work together.

"5—The industry published Standard Practice in Sheet Metal Work, but we still have hundreds of unsold copies and thousands of dollars of debt.

"6—Our efforts to organize for code compliance and enforcement demonstrate how badly disorganized our industry really is.

"7—P. W. A. and other agencies pay little heed to local resolutions and pleas for equitable hearing, but these agencies will listen to thousands of organized voices.

"8—If N. R. A. is disbanded in June we will need organization more than ever before, but there is much doubt that such organization will be perfected.

"9—Things can't be done without money. Our associations have never had enough money to do a real job. They are condemned for not doing things when the blame is with the industry, because it doesn't see fit to pay."

The second day's conference was devoted to code matters. W. Roy Eichberg, Philadelphia, Chairman of the Budget Committee, submitted a concise history of budget making. He explained that the



Newly elected officers of the National Sheet Metal Contractors' Association. Standing, left to right—Joseph C. Gardner, Treasurer; W. C. Markle, Secretary; T. F. Hanley, Director; C. Peterson, 4th V. P.; H. Stanyer, Director. Seated, left to right—George Brown, 2nd V. P.; M. F. Liebermann, President; W. E. Feiten, 1st V. P.

budget committee had absolutely nothing to work on—did not know the number of firms in the industry; their volume of business; their number of employees; the number of man-hours worked. As a result the budget was set up backwards by estimating the amount of money needed to install and operate the code and then allot division division budgets from this.

Budgets

N. R. A. ruled that a complete budget had to be submitted, even down to budgets for towns as small as 2,500 population. This was a gigantic task, but was accomplished. The result was the million dollar assessment which has rocked the industry.

This year's budget is based upon a flat rate for the national code authority and a sliding scale for the state and local authorities as per the published budget in the March, 1935, American Artisan.

Treasurer W. C. Markle, Pittsburgh, reported that total income of the national code authority up to March 31, 1935 has been \$34,000. Up to that same date more than \$64,000 has been spent, leaving a deficit of more than \$30,000.

At a round table discussion of ways and means for reducing government competition in business T. F. Hanley, Chicago, declared that the men in active charge of the handling of the huge 4 billion, 800 million public works bill know little or nothing about construction

and do not know our problems. Every man in the industry should make it a point to write his congressmen and urge adoption of measures favorable to us. He urged the conference to go on record as favoring all public work done by legitimate contractors.

David Sherrill, Tampa, Florida, said that until the time of the war prepared roofing was sold through the roofing contractor, but that following the war the manufacturers found themselves over-stocked and began selling through all sorts of fringe outlets, until today the roofing contractor is losing work at a tremendous rate. Mr. Sherrill further stated that the government has ruled he cannot sell small items over the counter nor job, resulting in a decided drop in his total volume of business.

Along the same line, A. P. Anderson, Birmingham, Alabama, said he does mostly furnace work, but finds unfair competition eating into his business. Better sales and ad-

vertising to the consumer are badly needed, he declared. Today, he said, the furnace man must be a salesman, an engineer, a merchandiser to get along. Our contractors can give just as good service; can sell as intelligently; can engineer as well if not better than the chains, the D. T. U.'s, direct selling organizations and with air conditioning a big future source of work, our industry will rise or fall on the basis of how aggressive we are.

Cost Accounting

Fred U. Ritter, Philadelphia, member of the cost accounting and bookkeeping committee said the committee has been wrestling with all sorts of overhead methods ever since its inception. Hundreds of questionnaires and surveys have been made. Some localities, said Mr. Ritter, have tried to set up a minimum overhead percentage, but this has been a failure. Mr. Ritter cited survey figures to show that the old saw 'The little shop has the lowest overhead' is all wrong and that to the contrary, overhead percentage reduces almost exactly in proportion to increasing volume of work.

Most of the Wednesday afternoon session was given over to questions and answers relating to code enforcement with Frank Harmon, Syracuse, N. Y. and Chairman of the Zone 2 code authority acting as chairman.

Ernest Gichner, Washington, D. C., asked what can be done for the man who was told his assessment would be 1/10 of one per cent; bid that way and got a job; then found his assessment was 1 percent and instead of the \$50 his assessment was \$500.



Officers of the National Code Authority in session with local, state and regional code authority committeemen from all parts of the country.

1935 National Code Authority



J. Boyd Griffiths
209 Water St., Binghamton, N. Y.
ZONE 2: New York State.

HISTORY: In roofing and waterproofing industry over 22 years. Treasurer and Assistant General Manager, Binghamton Slag Roofing Co., Binghamton, N. Y., one of the largest and oldest roofing and sheet metal companies in that territory. Director (President 1930-1931) United Roofing Contractors Association of North America. Member of Steering Committee of Roofing and Sheet Metal Code.



George Brown
413 Twentieth St., Brooklyn, N. Y.
ZONE 3: New York Metropolitan Area.

HISTORY: Age 59. Identified with sheet metal and roofing industry for 37 years. Member of the firm of Craig & Brown, Brooklyn, N. Y. Organizer of United Employers' Association of Roofers and Sheet Metal Workers. Member Trade Agreement Committee, sheet metal and slate.



W. Roy Eichberg
4210 Sansom St., Philadelphia, Pa.
ZONE 4: Eastern Penna., New Jersey, Delaware.

HISTORY: Entered heating and ventilating industry in 1905 at Cincinnati, Ohio, with Peck-Hammond Company. In 1923 organized the American Heating and Ventilating Co. of North Carolina at Raleigh. Also organized the Carolina Sheet Metal Corporation. In 1927 moved Carolina Sheet Metal Corp. to Philadelphia.



W. C. Markle
429 Fourth Ave., Pittsburgh, Pa.
ZONE 5: Western Penna., Ohio, West Virginia, Western Maryland, Michigan.

HISTORY: Secretary-Treasurer, Ra ner & Dinger Co., Pittsburgh. Became apprentice in sheet and metal shop in 1887. Secretary, National Association of Sheet Metal Contractors since July 1926. Secretary-Treasurer, Roofing and Sheet Metal Industries Conference. Secretary-Treasurer, Code Authority.



John R. Kirby
21 Union Wharf, Portland, Maine
ZONE 1: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut.

HISTORY: In the roofing business for more than twenty years. At present is president and treasurer, Portland Roofing Co., Portland, Me. Is a past president of the State of Maine Roofing and Sheet Metal Contractors Association and member of the New England Regional Code Authority.



Joseph C. Gardner
147 Kentucky Ave., Indianapolis, Ind.
ZONE 8: Indiana, Kentucky, Illinois, Wisconsin, Eastern Missouri.

HISTORY: Operates the Joseph Gardner Company, Indianapolis. Sheet metal fabricators and erectors of specialties, blow piping, ventilation, architectural sheet metal work. Also roofing work of all types. Firm founded in 1882. Treasurer of the National Association of Sheet Metal Contractors Association, Director, Sheet Metal Warm Air Heating and Roofing Contractors Association of Indiana.



David Sherrill
202 N. Delaware Ave., Tampa, Florida
ZONE 7: Florida, Georgia, Alabama, Mississippi, Tennessee.

HISTORY: Born 1892. Has been in roofing industry since early childhood. Firm bears father's name—T. B. Sherrill. Is one of the oldest, if not the oldest roofing concern in the South, having been founded in the 1880's and purchased by the present owner early in this century. "Dave" Sherrill was one of the organizers of the Florida state code authority.



Otto A. Wendt
2124 Southport Ave., Chicago, Ill.
Authority-at-Large: Representing air conditioning contractors.

HISTORY: Partner, Wendt & Cron Co., Chicago. Entered small shop doing sheet metal, roofing, skylight, cornice and furnace work as an apprentice at fifteen. Took over ventilation department of Mehring & Hanso Company, Chicago, in 1911. Formed own company in 1922, later expanded and formed Wendt & Cron Co. Company operating as heating, ventilating and air conditioning contractors.



Authority-at-Large

H. M. Sawrie
217 Third Ave., Nashville, Tenn.

Authority-at-Large: Representing the furnace contractors.

HISTORY: Manager of the furnace department of the Phillips-Butterfield Manufacturing Co., Nashville, Tenn. Company does a general warm air heating business throughout central Tennessee.



H. Stanyer
2422 Alamo St., Dallas, Texas
ZONE 10: Louisiana, Arkansas, Texas, Oklahoma, New Mexico.

HISTORY: Connected with the warm air heating and sheet metal industry for over 20 years. President and General Manager of the Dallas Heating and Ventilating Company, Dallas, Texas. This company does all classes of sheet metal, heating, ventilating and air conditioning work, also slate roofing. Past president, National Association of Sheet Metal Contractors.



D. A. Jackson
1045 W. Jefferson Blvd., Los Angeles, Calif.

ZONE 11: Washington, Oregon, Idaho, California, Nevada, Utah, Arizona.

HISTORY: President of the Atlas Roof Company, roofing contractors, Los Angeles. Vice-president, California Master Roofers' Association. Director, United Roofing Contractors Association.



Walter H. Miller
21st & Forest Ave., Kansas City, Mo.
ZONE 9: Western Missouri, Kansas, Nebraska, South Dakota, North Dakota, Montana, Wyoming, Colorado.

HISTORY: Affiliated since 1903 with Kansas City Slate & Tile Roofing Co., of which company he is secretary-treasurer. Company does slate and tile roofing exclusively. Past-Chairman and at present Member of Executive Committee, National Slate Association. Member, Board of Directors, United Roofing Contractors Association.

Roy Eichberg, Philadelphia, stated N. R. A. has definitely ruled that the 1 percent assessment by volume must be paid and that while the case was unfortunate, the contractor was stuck for the difference.

A. Brodbeck, Cincinnati, asked how many successful bid depositories have been set up and where are they. Chairman Harmon read a partial list of such depositories and promised a better list later.

Roy Roush, Baltimore, Maryland, said that his bid depository sends out lists of contractors who are in compliance and asks the awarding authority to accept bids only from those who are in compliance. This club serves to drive contractors into line. In answer to a further question he said that he believes this procedure is legal, but that mailing lists of those not in compliance might be construed as illegal.

A. J. Droege, St. Louis, said their experience had been that only through a bid depository could the too-low bidder be caught. Where too-low bids get to general contractor the general is asked not to use the bid. The St. Louis depository has had gummed slips made up and signed by the local code authority stating that the bidder who attaches the slip to his bid is in complete compliance.

Chairman Harmon stated that Zone 2 had had trouble with depositories until they established the practice of having all depositories in banks and that now all trouble is over.

F. E. Ederle, Grand Rapids, Michigan, asked whether non-competitive bids must pass through a depository and what control over non-competitive bids we have now.

Roy Eichberg, Philadelphia, replied that non-competitive bids cannot be controlled nor compelled to go through the depository, but that an amendment has been submitted with a ruling momentarily expected changing this status and putting non-competitive bids under the same procedure.

Harry N. Cain, Cleveland, asked how a contractor knows when a bid is competitive or non-competitive.

Chairman Harmon replied that this is covered by a definition of competitive bids which are defined as bids submitted on a set of specifications, with bid opening set for a definite date and place. Mr. Eichberg added that Washington has ruled that any code authority is only a fact-finding body and has no power of enforcement, and can only gather information and pass it along to a Federal agency for enforcement.

Roofing

Concluding the Wednesday sessions, John Hession, President of

OFFICERS, 1935

President—M. F. Liebermann, Ambbridge, Pa.

1st V. P.—W. E. Feiten, Cleveland, O.

2nd V. P.—George Brown, New York City.

3rd V. P.—T. F. Hanley, Chicago.

4th V. P.—C. Peterson, Minneapolis.

Treasurer—Joseph C. Gardner, Indianapolis.

Secretary—W. C. Markle, Pittsburgh.

TRUSTEES

A. W. Kramer, Cincinnati.

F. E. Merrick, Louisville, Ky.

Jules Gerock, St. Louis.

U. R. C., Louisville, Ky., briefly outlined his campaign for more business. His company canvassed every house in Louisville and noted every building which needed roofing or painting. Then the names of the owners were secured from the city directory and more than 14,000 enclosures mailed. An 8-page leaflet telling all about the company, its history, its jobs, its plan and about F. H. A. was sent out. The result has been that more business was handled during the first three months of this year than in the first five months of 1934.

The Thursday sessions were segregated so that roofers, re-roofers, slaters, waterproofers, sheet metal and furnace contractors might meet separately to discuss the particular problems of their field.

Heating

E. H. Riesmeyer, chairman of the warm air furnace committee acted as chairman for the heating session. In his report to the conference Mr. Riesmeyer said—“The public is becoming air minded. We are making the serious mistake, however, of calling all sorts of systems air conditioning. We should sell air conditioning according to the definition of the A.S.H.&V.E. and where it is only partial conditioning sell it as such. The cost of apparatus is coming down; this will enlarge our sales field. We have a serious problem in the contractor who knowingly or unknowingly sells his jobs at less than the cost of material and labor. We surely need licensing of contractors. I see no other way of controlling the irresponsible dealer and protecting the public and the trade except to license. In Pittsburgh we have prepared a licensing ordinance and confidently expect to see it become a law shortly.”

During the discussion which followed L. D. Mather, Cleveland, asked if this ordinance covered both gravity and mechanical systems. Mr. Riesmeyer replied that it did and also steam, vapor and hot water. An examining board will be set up, with divisions of the board for each type of system. Further, each certified contractor must have a shop and tools. The license will cost \$50.00 with a \$5.00 annual renewal.

D. A. Fisher, Cleveland, said a licensing ordinance is all right, but an active association must enforce the rules. Cleveland has invited into the furnace association everyone who will come. An educational program is conducted. Manufacturers and jobbers have been lined up and asked to assist. He declared that manufacturers should not install; neither should jobbers.

Charles Tharp, Ft. Wayne, Indiana, said his city has had a licensing law for nine years—first gravity; then mechanical. The law requires a \$25.00 fee payable every year, also requires a shop, tools, and gives inspection. Further, the city police department investigates all signs of work to

(Continued on page 60)

Material Size Separation with Exhaust Systems

SIZE separation is required in many industries and can usually be accomplished through vibrating screens or chain type conveyors as in the fruit grader. Where an exhaust system is demanded, however, as in woodworking plants, the size separation can sometimes be done by slight changes or additions to the existing duct work or separator.

If a plant sells its woodworking refuse considerably higher prices can usually be obtained by separating the shavings from the finer dust. Where the mixture is sold to people who expect to pulverize the shavings into wood flour, metal particles should be eliminated before the coarse product is fed into the pulverizers, which are usually very high speed hammer mills. A spark resulting from contact of a hammer with other metal parts naturally might result in a disastrous fire or explosion.

For dust and shavings separation some separator manufacturers in-

stall an inner cone as shown in Fig. I. This inner cone can be made of perforated metal to suit the degree of separation desired. The refuse outlets must be absolutely free of any back pressure as plugging occurs very easily if the dust is not kept moving.

For metal or other heavy or large particle separation from the dust the writer has seen the set-up shown in Fig. 2 successfully worked out. The swing baffle has to be adjustable to suit the material. To facilitate this adjustment the glass inspection doors shown have been found handy. The lower dampered openings can be adjusted to allow enough air to enter to carry up the fine dust which may have adhered to the larger particles. This inleak must be kept to a minimum, of course, to allow maximum suction at the hood.

If the recovery of the larger particles is desired and should they be fragile, it is sometimes desirable to add a felt bumper strip on the

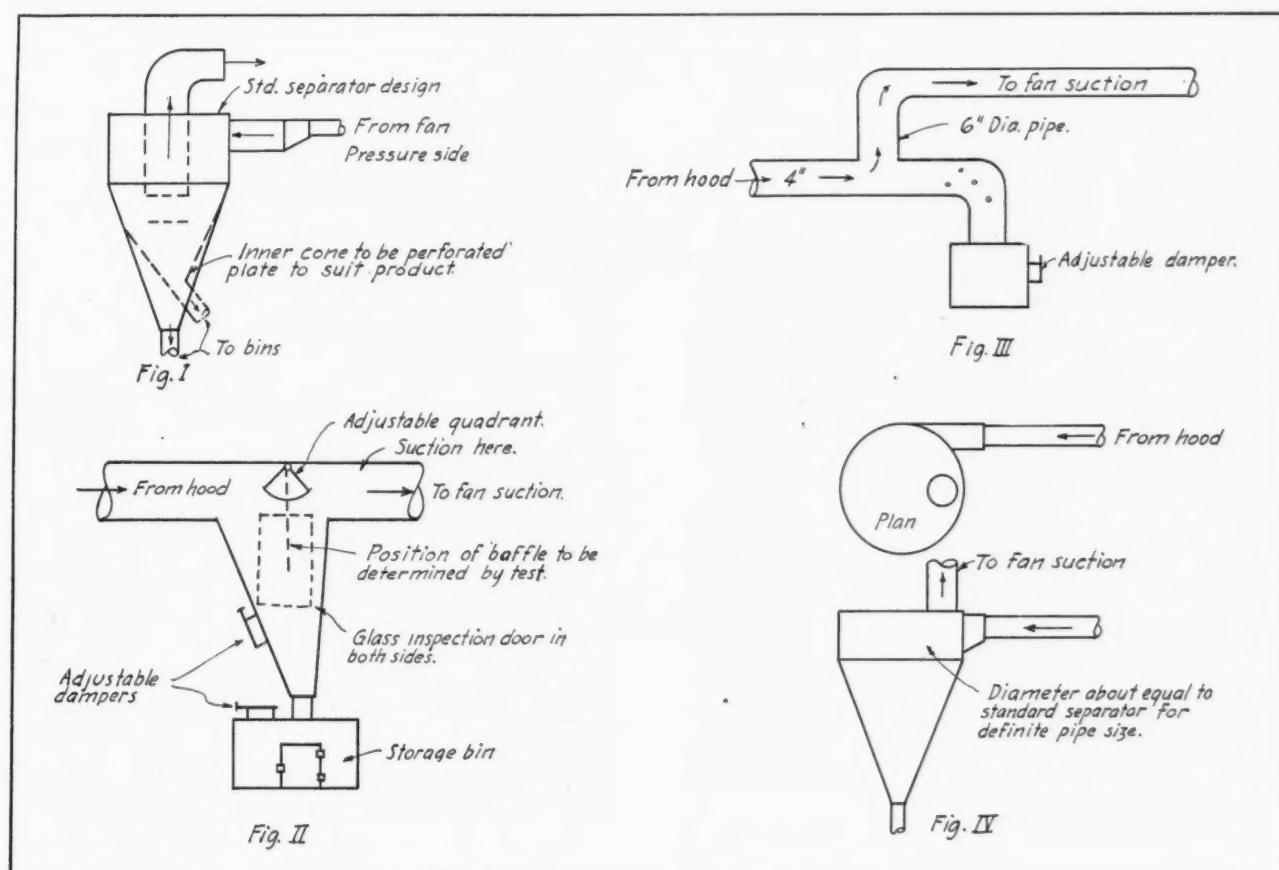
By J. W. Baybutt
Instructor, Rochester Athenaeum
and Mechanics Institute

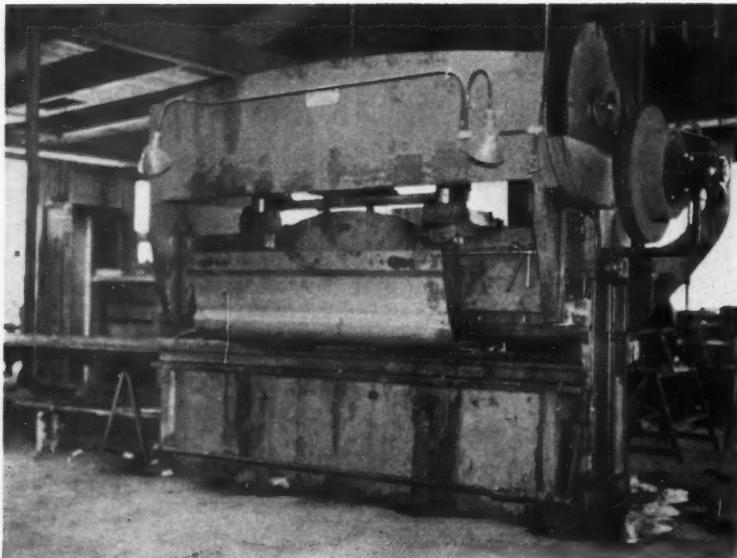
baffle and the sides of the separator. An inclined outlet also would probably be necessary when handling such fragile parts.

For a certain plastic material separation job, a stunt shown in Fig. 3 was tried out and proved fairly satisfactory. Here again, considerable experimenting has to be done to determine the proper pipe sizes to use so no definite design data can be submitted.

Fig. 4 shows another design, the location of the top outlet pipe being the determining factor in the successful operation of this type.

Many other similar tricks have been resorted to in an effort to accomplish this size separation in a way beneficial to the sheet metal contractor and consumer alike. There are, of course, many standard devices on the market which can accomplish the same thing and the writer has no desire to belittle these items in offering these suggestions to the sheet metal man.





THE fabrication of specialties has come to be an important activity of the sheet metal shop equipped with power machinery. The trend toward the manufacture of metal items for sales outlets requiring steady production, but not requiring elaborate production facilities, by sheet metal shops which have had former lines of work cut off, has been especially noticeable during the last few years. While the range of items covers practically all products made of metal those products not requiring expensive special dies and tools have been most favored.

An interesting example of a sheet metal shop's development from former activities to a combination of specialties plus its usual work is found in the Standard Sheet Metal Works of Milwaukee, Wisconsin. This old firm originally followed architectural metal work and ventilating, but in the last few years has worked into the fabrication of metal garages, skylights, ventilators, machine guards, tanks of all sizes and kinds, plus specialties of monel metal, copper, zinc and aluminum.

Two interesting products serve to illustrate the methods of this



A top sheet with two sides formed into a channel and two end channels welded to the top sheet make up the bottom. The channel is filled with asphalt.

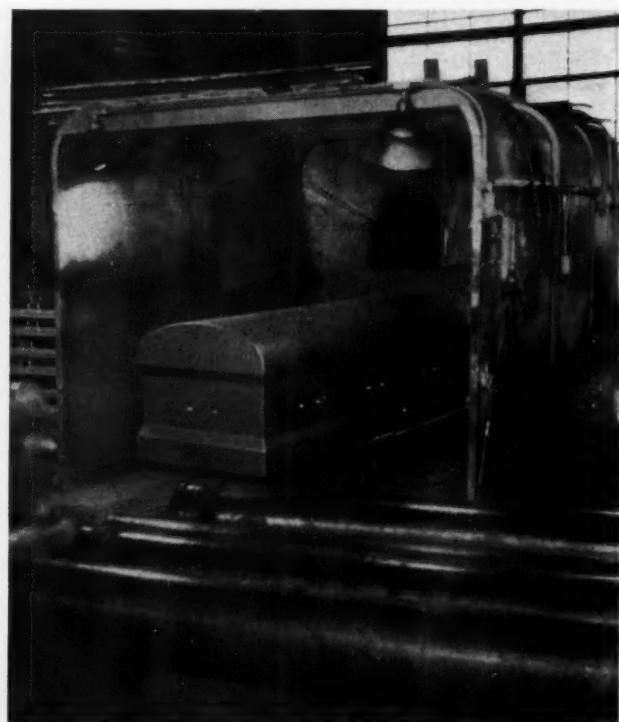
Grave Vaults, Clothes Dryers-- Two Specialties By a Sheet Metal Shop

The cover picture shows an operator welding ends in the top of a vault.

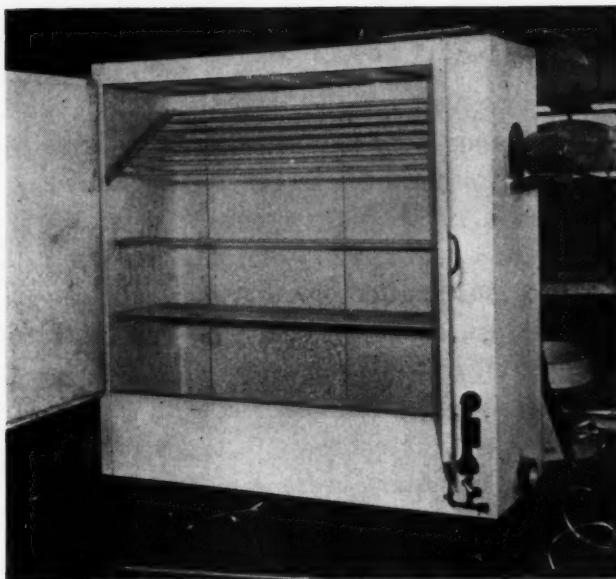
shop—grave vaults and clothes dryers.

Some months ago a Milwaukee man needed a source of supply, equipped to fabricate the vaults in limited numbers, but steadily. A production connection was made with the Standard shop.

These vaults are made of 12 gauge copper bearing sheet steel. The complete vault weighs approximately 400 pounds and consists of a pre-fabricated top, two ends and a bottom. Production was devised so that a 15-horse power press brake was equipped with the necessary dies to form the three



The finished vault is spray painted in a special booth. Above the big press is putting the last bend to a top sheet.



A cabinet-type dryer with doors open to show construction. The inside heat ducts and the circulating fan can be seen.

largest sections—top and two bottom pieces. A circle cutter was allotted and set up to cut out the ends.

The large sheet for the top is passed through the press brake in four passes to form the two lower edge mouldings and the two arcs along the sides of the upper part of the top's curve. Before being placed in the press brake the sheet is passed through a forming roll and curved to the arc specified for the top.

One operation—that of cutting—is required for the ends. The bot-

tom consists of three pieces: a top sheet having the two sides formed into a channel and two end channels which are welded to the top sheet to form a continuous channel all around. When assembled the finished top fits into the channel where it is sealed with asphalt. This gives a moisture proof vault.

The ends are welded electrically into the top. The welding department of the Standard company was enlarged slightly and suitable cradles were made of wood so that the top could be hung and turned in all directions to facilitate welding operations. When the department is not working on the vaults all these special cradles can be moved out of the way.

The assembled top and bottom are sprayed with asphalt inside and outside to preserve the steel. Then the finishing coat is sprayed on. This coat may be silver, gold, copper or bronze as specified. The spraying operations are carried on in a specially built booth which is well lighted and equipped with its own exhaust system.

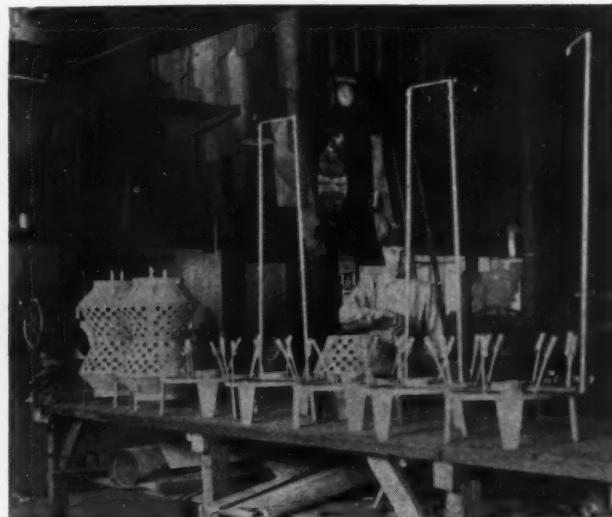
Clothes Dryers

The second item is the clothes dryer. There are two types—one a cabinet model with a gas burning heating element and a small circulating fan and another which con-

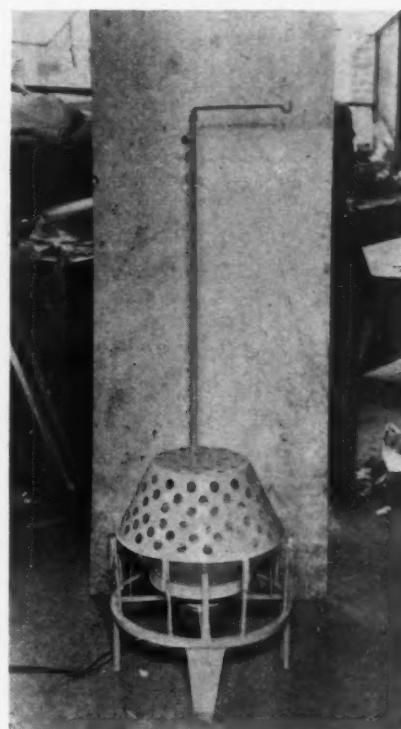
sists of a rack on which a garment is hung as shown. A small propeller fan blows air up into the dress. A specially perforated plate distributes the air so that the dress is ballooned out and aired completely.

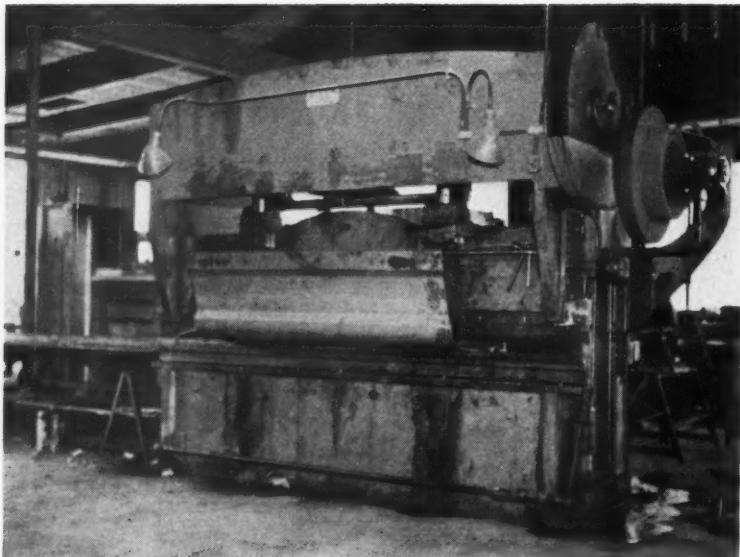
Another Milwaukee man R. J. Stahl devised this dryer. The cone shaped air distributor is perforated in the shop and formed and soldered into a single unit. The circular frame with legs and rack standard is then assembled and welded together. The use of the dryer is as

(Continued on page 67).



Left the single garment dryer in use and, right, view of the completed unit ready for shipment.





THE fabrication of specialties has come to be an important activity of the sheet metal shop equipped with power machinery. The trend toward the manufacture of metal items for sales outlets requiring steady production, but not requiring elaborate production facilities, by sheet metal shops which have had former lines of work cut off, has been especially noticeable during the last few years. While the range of items covers practically all products made of metal those products not requiring expensive special dies and tools have been most favored.

An interesting example of a sheet metal shop's development from former activities to a combination of specialties plus its usual work is found in the Standard Sheet Metal Works of Milwaukee, Wisconsin. This old firm originally followed architectural metal work and ventilating, but in the last few years has worked into the fabrication of metal garages, skylights, ventilators, machine guards, tanks of all sizes and kinds, plus specialties of monel metal, copper, zinc and aluminum.

Two interesting products serve to illustrate the methods of this



A top sheet with two sides formed into a channel and two end channels welded to the top sheet make up the bottom. The channel is filled with asphalt.

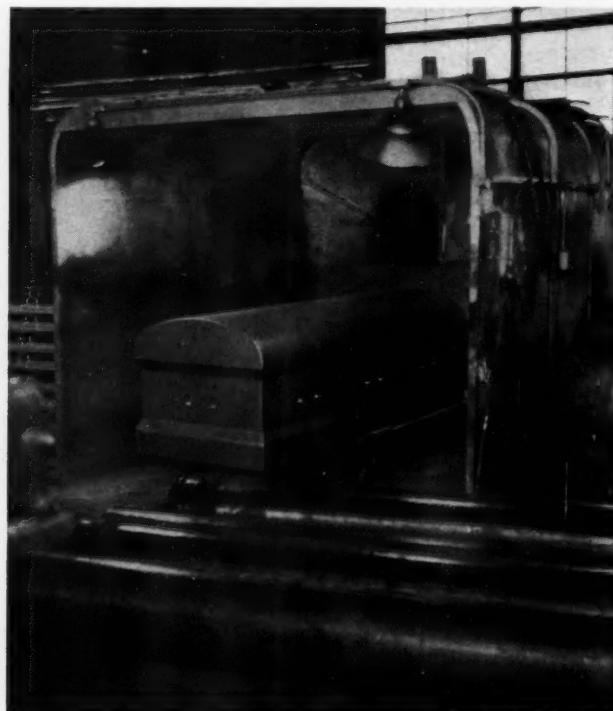
Grave Vaults, Clothes Dryers-- Two Specialties By a Sheet Metal Shop

The cover picture shows an operator welding ends in the top of a vault.

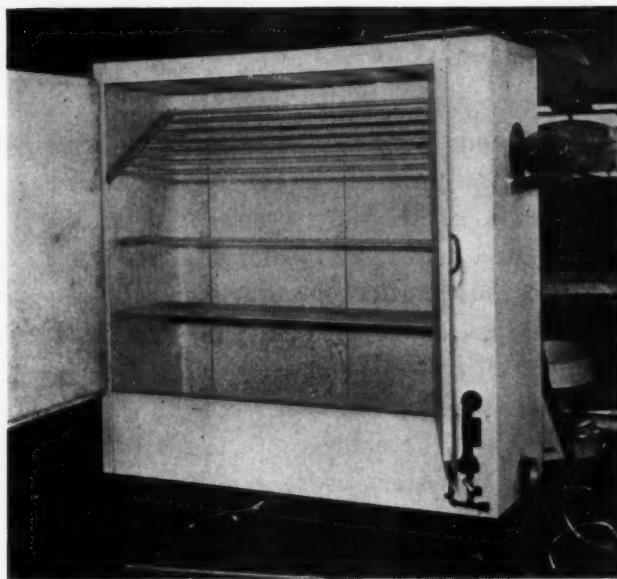
shop—grave vaults and clothes dryers.

Some months ago a Milwaukee man needed a source of supply, equipped to fabricate the vaults in limited numbers, but steadily. A production connection was made with the Standard shop.

These vaults are made of 12 gauge copper bearing sheet steel. The complete vault weighs approximately 400 pounds and consists of a pre-fabricated top, two ends and a bottom. Production was devised so that a 15-horse power press brake was equipped with the necessary dies to form the three



The finished vault is spray painted in a special booth. Above the big press is putting the last bend to a top sheet.



A cabinet-type dryer with doors open to show construction. The inside heat ducts and the circulating fan can be seen.

largest sections—top and two bottom pieces. A circle cutter was allotted and set up to cut out the ends.

The large sheet for the top is passed through the press brake in four passes to form the two lower edge mouldings and the two arcs along the sides of the upper part of the top's curve. Before being placed in the press brake the sheet is passed through a forming roll and curved to the arc specified for the top.

One operation—that of cutting—is required for the ends. The bot-

tom consists of three pieces: a top sheet having the two sides formed into a channel and two end channels which are welded to the top sheet to form a continuous channel all around. When assembled the finished top fits into the channel where it is sealed with asphalt. This gives a moisture proof vault.

The ends are welded electrically into the top. The welding department of the Standard company was enlarged slightly and suitable cradles were made of wood so that the top could be hung and turned in all directions to facilitate welding operations. When the department is not working on the vaults all these special cradles can be moved out of the way.

The assembled top and bottom are sprayed with asphalt inside and outside to preserve the steel. Then the finishing coat is sprayed on. This coat may be silver, gold, copper or bronze as specified. The spraying operations are carried on in a specially built booth which is well lighted and equipped with its own exhaust system.

Clothes Dryers

The second item is the clothes dryer. There are two types—one a cabinet model with a gas burning heating element and a small circulating fan and another which con-

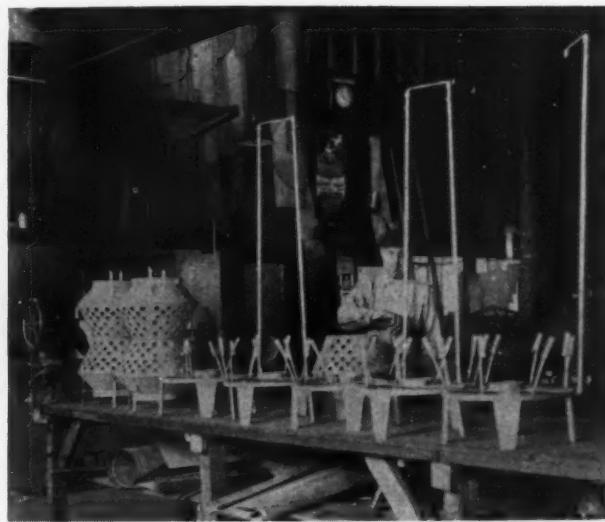
sists of a rack on which a garment is hung as shown. A small propeller fan blows air up into the dress. A specially perforated plate distributes the air so that the dress is ballooned out and aired completely.

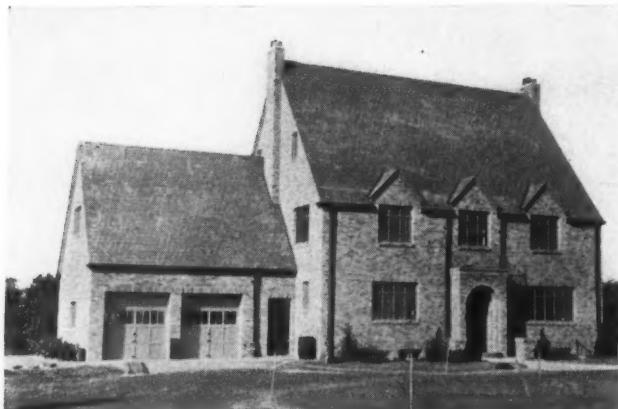
Another Milwaukee man R. J. Stahl devised this dryer. The cone shaped air distributor is perforated in the shop and formed and soldered into a single unit. The circular frame with legs and rack standard is then assembled and welded together. The use of the dryer is as

(Continued on page 67).



Left the single garment dryer in use and, right, view of the completed unit ready for shipment.





Field Test of a Forced Air System

THE installation field tested and discussed in this article is located in Streator, Illinois. The contractor—A. Conzelman—wanted the best available advice on the problems presented and secured the joint help of engineers and manufacturers before starting the installation. The result is a furnace, fan, oil burner selected and matched for the particular problems by the manufacturers; a layout for apparatus and for a piping system by a well-known heating engineer; a control system especially designed



for the job by the control apparatus manufacturer.

The story of the installation is interesting. This house is the outgrowth of several years of planning on the part of the owner. The furnishings were individually selected or made to order. Construction was under way during a first summer, the following winter and a second summer. The heating system was installed during the first autumn and was used during the winter to keep the interior warm enough for the workmen.

Some Problems

These were the major problems:

At the Left—a front view of the furnace and—right—a rear view showing the blower housing and trunks.

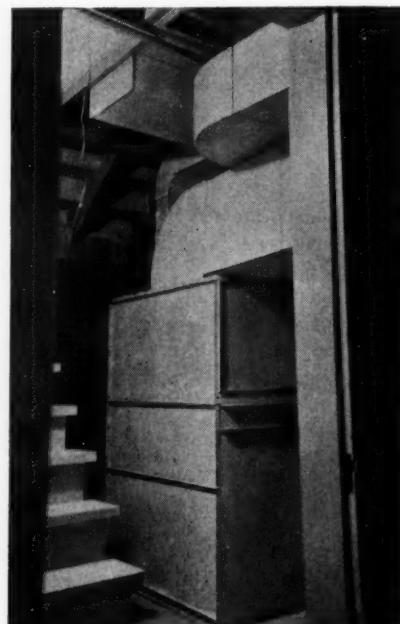
Number 1

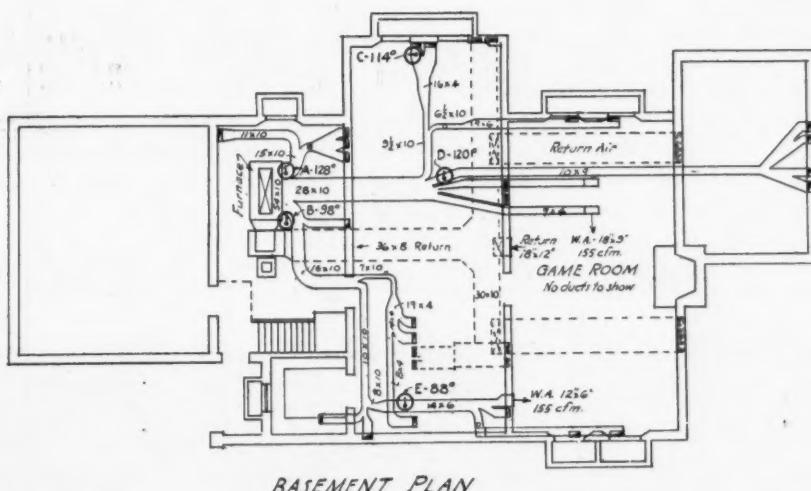
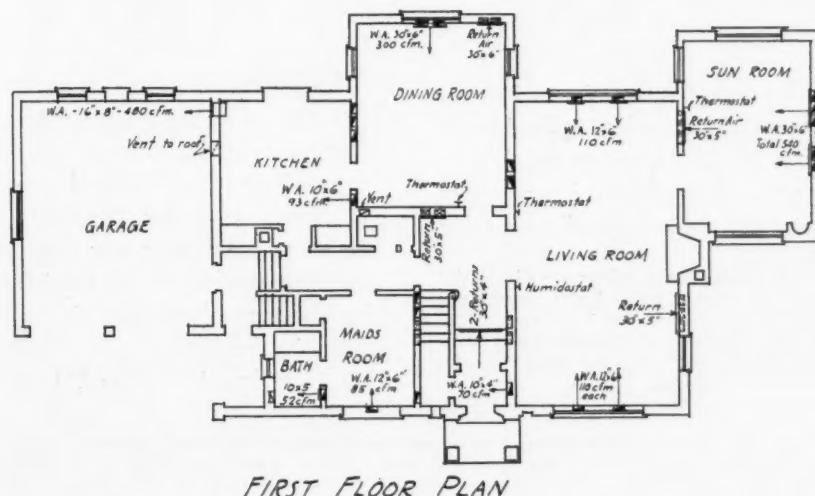
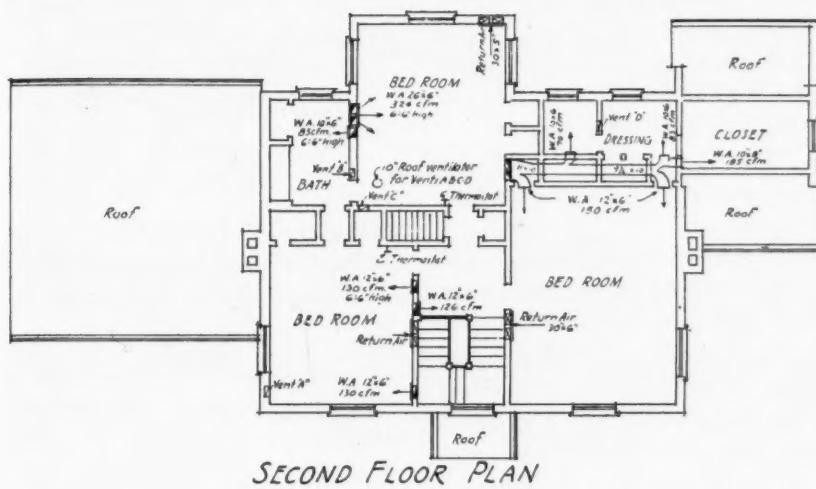
In the past four years AMERICAN ARTISAN has published dozens of articles discussing the design and installation of forced air heating systems. A most important question is—what happens when these installations are started up? Do the jobs deliver the amount of air specified? Are all rooms adequately heated? Does the system perform according to specifications? The only way to tell is to field test the system. Here is a story of just such a field test.



At Top—The exterior of the house. Directly Above—The outside wall of the sun room showing the four registers under windows. Two branches—each branch split two ways—serve these inlets.

1. The house is severely exposed; standing on the edge of a golf





One right above the other! Begin with the basement and follow the zones through to the registers in order to get an idea of how the system was designed.

course and on high ground. 2. The size of the house; the large expanse of roof; an attached garage which is heated and has future living quarters above. 3. The owner's wish for segregation of rooms with each group automatically controlled so that different temperatures can be

maintained. 4. A solarium exposed on three sides and much lived in. 5. Steel windows, of larger-than-ordinary size, with several groups of windows in principal rooms. 6. Arrangement of basement rooms (including a game room) which complicated duct locations. 7. The

owner's wish for the maximum of comfort with controlled temperature, humidity, cleanliness and air circulation.

The piping plan and floor plans show the general features of the design. All ducts were sized according to frictional resistance with the intention of getting the required amount of air from every register without having to set a single damper. Special attention is called to the registers on the first floor—all registers are located under windows in outside walls. Each room has one return, excepting the kitchen and maid's room. The bathrooms are vented to the outside through the attic. The return in the first floor hall is in the stair risers.

Features

Probably the three features of most interest are the piping system, the control system and the outside wall warm air registers.

It was found that due to arrangement of ducts it was not possible to avoid dampering. Most of the runs could operate without setting dampers; but some of the runs which are quite long or contain complicated fittings, had to be given assistance. The ducts were sized for a register temperature of 140 degrees. The amount of air required at ten degrees below zero (owner's specifications) is shown room by room on the data sheet. Each c.f.m. was calculated to give 70 degrees inside, excepting the garage which was calculated for 45 degrees.

By adding together the c.f.m. for branches served by any one of the three main runs off the plenum and dividing by the square feet of duct area we find that the actual velocity a few feet from the plenum is approximately 850 feet per minute. The branches were so sized that this velocity is maintained in practically every branch.

Controls

The control system was laid out to use six thermostats and seven zone damper motors. The thermo-

stats are located as follows—living room, dining room, sun room on the first floor; one thermostat in each principal bed room on the second floor. The seven zone damper motors are located as shown in the basement piping plan. Each thermostat controls the zone damper for its particular room, excepting the living room thermostat which controls two zone damper motors.

Wiring Troubles

The control equipment manufacturer decided to simplify the required wiring by assembling all transformers on a control panel and placing plainly marked binding posts for thermostats and zone damper motors. It may be of some interest to note that the local electrician, to whom was entrusted the job of wiring up the system, could not make out what the wiring diagram was all about and so proceeded to by-pass the box. The result (hard to believe, perhaps)

was that some damper motors had eight wires connected to them when the first field test was attempted. Needless to say, the job could not be tested until all this wiring was pulled out and the system re-wired.

The purpose in using outside wall registers under windows throughout the first floor was to offset in advance any feeling of chill a person might have when sitting in front of the large windows. The owner made known in advance that furniture would be so located that position next to windows would be favored, especially in the living and sun rooms.

The registers were located at the center points, with split branch ducts in the basement so that as many as four under-window registers could be taken off one main

◆

On the data sheet below we show the designed operation and the actual operating results obtained by test. Remember, register air temperatures were brought up to design by changing the burner nozzle.

branch pipe. The registers were sized so that issuing air would float out and upward over the glass areas rather than be injected into the room at high velocities. This would, it was thought, place a gently rising curtain of warm air between the cold glass and anyone sitting near the window.

Results

With this outline of the design of the system and the intentions of the contractor, owner and engineer in mind, we can see just what results were actually recorded by testing instruments. The field tests consisted of the following investigations—test of register air temperatures; tests to determine c.f.m. at every register with fan running and zone open; tests for temperature drop along basement runs; tests of room temperatures; tests to determine the general comfort throughout the house.

(Continued on page 63)

Rooms No.	B1	101	102	103	104	105	106	107	108	201	202	203	204	205	206	207	208	
Use	Game Room	Garage	Kitchen	Dining Room	Vestibule	Maids Room	Bath	Living Room	Sun Room	Bath	Bed Room	Bed Room	Stair Hall	Bed Room	Bath	Dressing	Closet	
MEASUREMENTS																		
Room Dimensions.....	17'x30' x8' x11'	20'x22' x11'	13'8"x 14'6"x9'	14'6"x 17'x9'	5'6"x 3'6"x9'	9'6"x 11'0"x9'	5'0"x 7'4"x9'	17'2"x 30'0"x9'	13'4"x 8'10"x9'	8'6"x 10'6"x8'	15'6"x 18'x8'	15'6"x 2,260	15'6"x 715	9'x15'6" x17'	17'6"x 21'6"x8'	5'6"x 3,000	8'0"x 352	13'0"x 44
Cubic Feet Space.....	4,080	4,840	1,780	2,220	173	940.5	330	4,620	2,260	2,230	1,860	1,115	376	3,000	352	5'6"x 44	8'0"x 44	13'0"x 84.5
Floor Const. & Factor.....	50-10	50-15																
Ceiling Const. & Factor.....	26-11.7																	
Window Const. & Factor.....	1.2-100	1.2-38	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	1.2-100	
Wall Const. & Factor.....	51-15	247-10	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	247-19.8	
Exposed Sash and Door Perimeter, equiv.....	40	143	15	60	20	15	4.5	88	90	15	47	30	15	30	15	15.5	16	
Leakage B.t.u. per ft. of Perimeter.....	80	50	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	
Expt. Wall Gross Area.....	368	680	123	270	47	86	108	414	297	48	224	244	108	244	49.5	64	250	
Expt. Window Gross Area.....	48	71	13.5	65	21	27	4.5	110	116	9	46	36	18	36	9	12	12	
Expt. Wall Net Area.....	320	609	109.5	205	26	59	103.5	304	181	39	178	208	90	208	40.5	52	238	
Exposure Direction.....	N. & S.	N. W.	N.	S.	S.	S.	S. W.	S.E. & N.	N. E.	N.	S. W.	S.	S. E.	N.	N.	E.		
Room Temperature.....	70°	45°	70°	70°	70°	70°	70°	70°	70°	70°	70°	70°	70°	70°	70°	70°		
HEAT LOSSES																		
Wall Loss B.t.u. per hr.....	4,800	6,000	2,170	4,050	515	1,170	2,022	6,000	3,580	773	3,520	4,120	1,780	4,120	800	1,080	7,000	
Window Loss B.t.u. per hr.....	4,800	2,700	1,350	6,500	2,100	2,700	450	11,000	11,000	900	4,600	3,600	1,800	3,600	900	1,200	1,200	
Subtotal Loss B.t.u. per hr.....	9,600	8,790	3,520	10,550	2,615	3,870	2,472	17,000	15,180	1,673	8,120	7,720	3,580	7,720	1,700	2,280	8,200	
Expos. Allow. B.t.u. per hr.....	1,440	2,640	1,057	3,170	130	193	370	3,400	4,550	500	2,430	1,160	179	772	510	685	1,640	
Floor Loss B.t.u. per hr.....	5,100	6,600																
Ceiling Loss B.t.u. per hr.....	5,150																	
Leakage Loss B.t.u. per hr.....	3,200	7,050	1,200	4,800	1,600	1,200	360	7,040	7,200	1,200	3,760	2,400	1,200	2,400	1,200	1,240	1,280	
Total Heat Loss.....	19,340	30,230	5,777	18,520	4,345	5,263	3,202	27,440	33,280	5,231	20,110	16,130	7,859	18,722	4,325	5,120	11,536 Total 236,430	
SERVICE																		
Air Supply C. F. M. (Calculated).....	310	480	93	300	70	85	52	440	540	85	324	260	126	300	70	83	185 Total 3,803	
Air Supply C. F. M. (Recorded).....	No Data	No Data	155	110 & 156	58	107	55	150, 165, 105, 100	93, 117, 105, 110	140	87 & 152	98 & 91	110	208 & 104	89	125	154	
Air Supply Inlet Temperature (Calculated).....	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°	140°		
Air Supply Inlet Temperature (Recorded).....	No Data	No Data	108°	110° & 110°	90°	94°	88°	107°, 107°, 90°, 90°	107°, 104°, 108°, 106°	116°	112° & 112°	91° & 88°	90°	92° & 100°	102°	106°	102°	

Grate Surface Required 4.1 sq. ft.—Heating Surface Required 125 sq. ft.

New York State Convention Enjoys Large Attendance, Good Exhibits, Lively Sessions

THE twelfth annual convention of the New York State Sheet Metal and Roofing Contractors' Association held in Rochester, April 8, 9, and 10, surpassed the meetings of the last few years in attendance, interest and exhibits with manufacturers' products covering practically every activity of the industry.

Of high interest to the large attendance was the second day which was devoted to thorough discussion of the mail order situation and the unusually good addresses in the well balanced program. A feature of particular benefit was the allotment of time after each address for discussion, these discussions bringing out numerous points of direct interest to the contractors.

The meeting opened with an address by J. Boyd Griffiths, Binghamton, on the benefits of the code. Mr. Griffiths gave a resume of the code discussion, provisions and progress reported at the Cincinnati conference. The report of the conference in this issue covers the report completely. Mr. Griffiths amplified those features of code work which apply directly to the sheet metal, roofing and furnace contractor and pointed out how the code is now in a critical stage and can

be made valuable only if every organization gets behind the local, state and area authorities.

Insurance

"Compensation and Liability Insurance" a study of the need for such protection was the subject of an address by Wellington Potter. The speaker explained how the contractor who is fully insured has complete protection from the dangers of suit because of workmen's carelessness or accidents. The speaker pointed out that complete insurance can be used as a strong sales weapon to combat the price operator who carries no insurance and who leaves the home owner open to suit should an accident occur.

Merchandising

"Roofing and Sheet Metal Merchandising" was the topic of Frank Harmon, Syracuse. Mr. Harmon said that he did no roofing or sheet metal work, only furnaces and air conditioning, but that he felt the principles he uses were applicable to any other branch of the industry. The outstanding need of the industry, he asserted, is information on how to sell. On a chart he showed a human brain divided into three

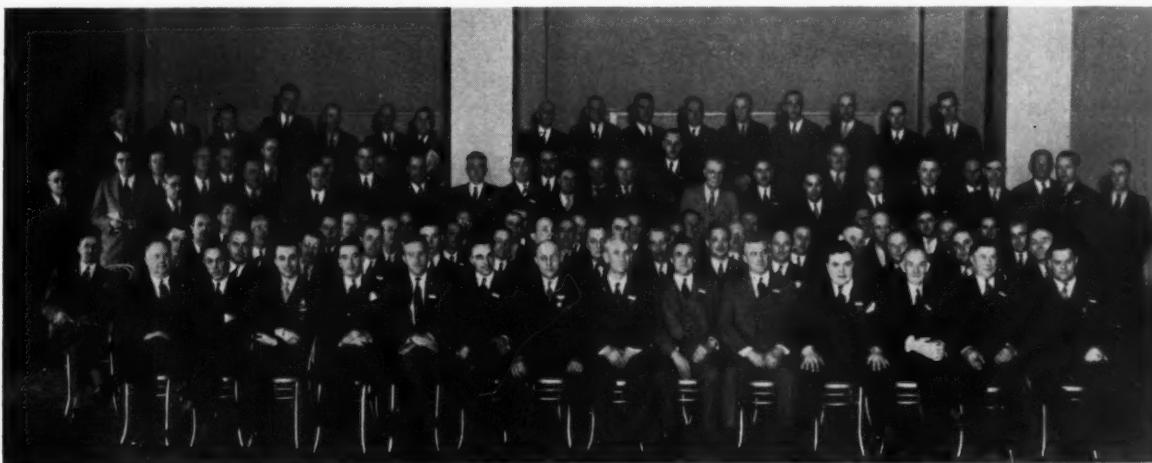
sectors and called these the reasoning, will and feeling mind. Any sale must meet the objections of these three divisions. The reasoning sector considers appearance and physical characteristics. The feeling sector considers pride, convenience, cleanliness, etc. The will sector is the key which signs the contract and says "yes."

"Service is the feature on which contractors can build a profitable, enduring business. All companies like National Cash Register, have built on service.

Sales Steps

"The first step in a sale is to get attention. The second step is to create desire, and the last step is to close the sale. One good way to keep the sale procedure progressing is to frequently ask questions which require a 'yes' or 'no' answer. Enough yeses make it hard for the prospect to say 'no' when the order is placed before him.

"Every contractor should cultivate the loyalty of his employees. Mechanics are frequently believed in preference to the salesman. Mechanics properly trained can dig up an astonishing amount of business if they are trained to see and are loyal enough to turn



Some of the members of the New York State Sheet Metal and Roofing Contractors' Association at the 1935 convention

the business in rather than try to do it in their spare time."

Salesmen's Pay

In the discussion following, George Ballard, Rochester asked how Mr. Harmon secured his salesmen and how they were paid. Mr. Harmon replied that he runs a classified ad for young men and usually gets 10 to 15 replies. These men are interviewed individually and given catalogs to take home and study. The next day they are asked more questions and the whole proposition is explained to them. Usually 5 men remain to work. These men are taught the Standard Code, are given canvassing instructions, sent out with mechanics to learn installation work, shown all kinds of jobs and then started out. They are paid a straight 12 per cent commission.

In reply to the question, "How can you pay commission according to the code", Mr. Harmon stated that firms hiring salesmen are given a 60-day training period. He uses this time or as much of it as is necessary to put the men in school during which period they are not salesmen. While it is necessary under the code to pay the minimum of \$16.00 a week, Mr. Harmon said he didn't want to keep any man who can't earn at least that much.

H. T. Richardson, Richardson-Boynton Co., gave a brief outline of the history of the Standard Code and Research Residence program, and warned the association that large outside corporations are looking at the residential air conditioning market with envious eyes. Only through organized education and cooperation will our industry be able to hold its present status as the chief outlet for air conditioning apparatus, he declared.

Stainless Steel

The subject of stainless steel from a metallurgical study and its present and future sales possibilities was presented by F. H. Ramage of the Republic Steel Co. The speaker explained briefly the characteristics and uses of

the several stainless steels now on the market. "This industry no longer enjoys a surplus consumer demand," he pointed out, "and we now have to create a desire for the things we have to sell. Building revival is certain, although we do not know just where it will be felt first. There will be new home building, for the country needs homes. Of more importance is the fact that the government has really started something in its modernizing and remodeling programs like HOLC and FHA. A still newer program and one which has great possibilities is the Modernize Main Street movement. These new fronts and in-

plete display of color combination and laying method was shown. Mr. Ballard declared that slate roofing is a sick business with about one-fifth the business of five years ago. Architects know nothing about color, type or laying method; home owners know less, so it remains for the contractor to demonstrate and sell, he stated. Laying methods whereby thin slate can be made to look like thick slate when laid in the roof were explained, also the importance of line, shadow and alteration of size and color.

Forced Air

D. W. Norris and F. Hackenschmidt of Syracuse passed out a gravity and mechanical system layout with a filled-in data sheet at the evening session and explained some design problems and important calculations. Allowing time for discussion this session brought out several arguments over relative merits of different ways of engineering a job.

Edwin A. Scott, New York was the first speaker on the Mail Order Problem. "We won't get far by damning the mail order houses. We need facts with which to fight. One fact is that mail order houses are real competition. A second fact is they cannot be legislated out of business. A third fact is that shutting off their source of supply is no obstacle.

"There are two ways to combat their inroads. First by changing laws to restrict or control their activities and, second, by beating them at their own game. Proper ordinances controlling the installation of furnaces, roofing, and sheet metal work have proven one way to insure that only first class work is done. Cities with good ordinances suffer least from mail order competition. We are given to understand that today the mail order houses are selling about 10 per cent of their furnaces from the catalog and 90 per cent from stores and that both groups together account for not more than 10 per cent of the sales made in the country last year.

(Continued on page 48)

OFFICERS

President—H. W. Noragon, Buffalo.
First V. P.—Clarence Meyer, Buffalo.
Second V. P.—James Keays, Albany.
Secretary—Adolph Hesse, Utica.
Treasurer—Edward F. Klick, Rochester.

DIRECTORS

James A. Heaphy, Syracuse.
 W. P. Shaver, Ilion.
 H. A. Daniel, Newburgh.
 Thomas Woodard, Rochester.
 Emil Everts, Syracuse.
 A. C. Frydenborg, Amsterdam.

terior will undoubtedly use great quantities of sheet metal in keeping with the present vogue for bright, flashy exteriors and interior decoration."

Slate Roofing

A very interesting discussion of slate roofing was conducted by George Ballard, Rochester. Mr. Ballard placed on an easel slate samples explaining the origin, characteristics and approximate cost of each. To demonstrate his explanation of right and wrong ways to blend colors and lay rows, the speaker presented four large panels upon which a com-

April, 1935

or combination
d was shown.
red that slate
business with
e business of
chitects know
r, type or lay-
owners know
for the con-
trate and sell,
methods where-
made to look
en laid in the
l, also the im-
shadow and
nd color.

air

l F. Hacken-
passed out a
nical system
in data sheet
sion and ex-
gn problems
ulations. Al-
scussion this
several argu-
merits of dif-
eering a job.
ew York was
the Mail Or-
yon't get far
mail order
facts with
fact is that
real compe-
is they can-
of business.
shutting off
y is no ob-

rs to combat
y changing
ontrol their
by beating
me. Proper
the instal-
ooing, and
ave proven
t only first
Cities with
least from
n. We are
that today
are selling
their fur-
g and 90
and that
account for
cent of the
country last

ge 48)

Air Conditioning Section

Devoted to the technical and merchandising problems
of air conditioning in homes and small buildings

AS this April issue reaches you, the thought of most of those in the industry (and many others on the outside looking in) is beginning to focus on summer cooling. --- Will home owners and commercial establishments buy cooling this summer? What will be the type of cooling and apparatus favored? Will our biggest obstacle be cost? Where are the ripest prospects to be found? Who is going to install cooling systems?

--- Some of these questions we will answer directly in the next six issues. Some questions we will leave to your decision, but we will supply information on which to base your conclusions.

--- The first cooling article appears in this issue. It is a notable compilation of design and operating facts—tells how a system was engineered and gives you some powerful cost ammunition. This month is none too early to sort out your prospect lists; to determine how much and what kind of a campaign you will pursue; to study your cooling resources (like water, ice, compressors).

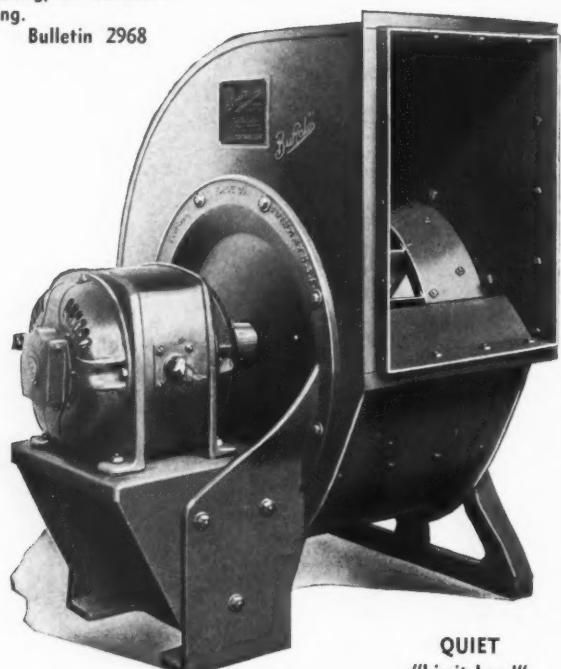
More Prospects for AIR CONDITIONING!

**Sell
them "Buffalo"**

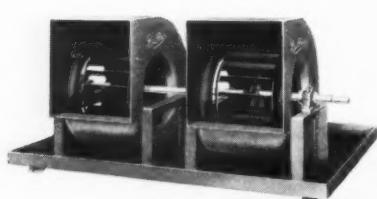


"HVA" FAN
for heating, venti-
lating, air condition-
ing.

Bulletin 2968



QUIET
"Limit-Load"
Ventilating Fan



"Stripped" PC Comfort Conditioning Cabinet

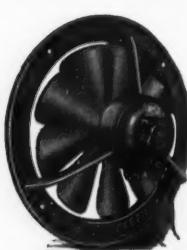
1935 is going to be the best year in history for AIR CONDITIONING—and 1936 will be better! The amount of business you'll do depends on your willingness to TALK Air Conditioning and Ventilating to your customers,—and upon the QUALITY of the equipment you sell.

Buffalo Fans, Comfort Conditioners and Unit Coolers are made in a complete range of capacities, so that you can sell units of just the right size. They need no introductions to your prospects—the Buffalo name on fans has been known for more than 50 years, and on air conditioning equipment for half that long. And—Buffalo engineers have taken all the complaints out of this equipment! It has been tested, checked and approved for use!

If you are interested in making more money with Buffalo equipment—Write for Bulletin 2966.

BUFFALO FORGE COMPANY
497 Broadway Buffalo, N. Y.
In Canada: Canadian Blower & Forge Co., Ltd.,
Kitchener, Ont.

Write for Bulletins & Prices

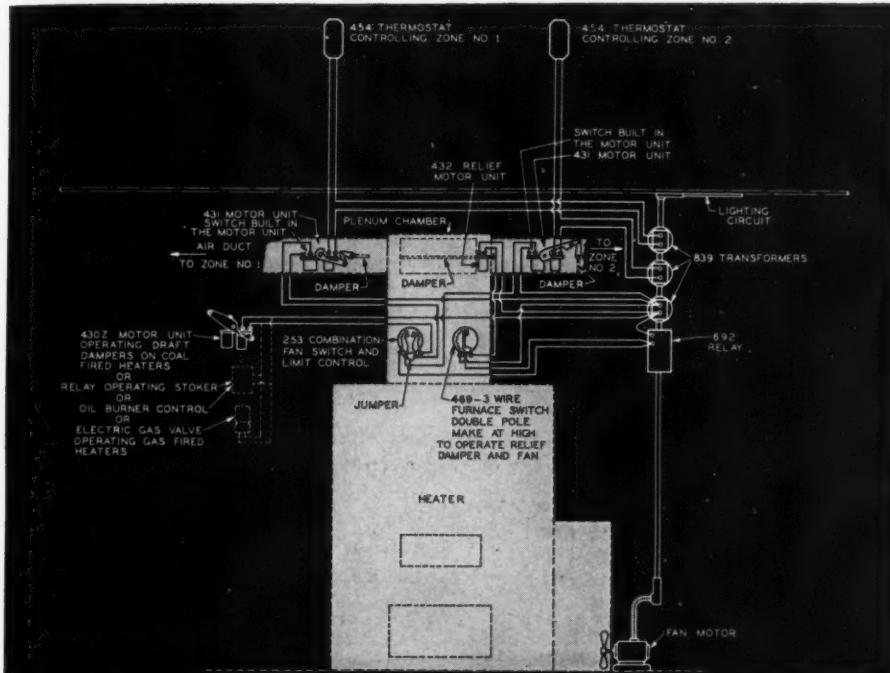


BREEZO
Ventilating Fan



Automatic Louver Breezo Fan

SATISFACTORY Zone HEATING



assured with
"GENUINE DETROIT" CONTROLS

- Regardless of the architecture of a building, zone control with forced air will heat it satisfactorily. When desired, a uniform temperature in all rooms can definitely be maintained or certain rooms may be kept at temperatures higher or lower than the remainder. Zone Control offers quicker response when heat is called for and avoids overheating or waste of fuel.
- Each zone is controlled by its own thermostat which governs the operation of a zone damper in the main supply duct. Each zone damper is actuated by a No. 431 Motor Unit.
- The opening of any zone damper automatically turns on the heat by starting the main heating unit. Although any one or more zone dampers may be closed, the heat supply is not closed off until all zone thermostats on the system are satisfied.
- The "Genuine Detroit" Motor Unit is noiseless and is regularly mounted directly on the duct without any danger of objectionable noises being telegraphed along the ducts to the rooms above.
- Write for Bulletin 66-A for detailed description of "Genuine Detroit" Controls applied to Zone Heating.



No. 431—Duct damper motor showing standard mounting.

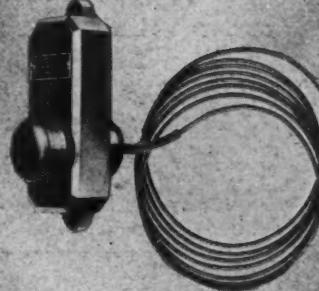
No. 444
Thermostat



No. 443 or 445—
Thermostat for night
and day or heating
and cooling.



No. 255 or 244—Furnace
limit and fan switch.



No. 691—Differential thermostat operates on the difference between outdoor and indoor temperatures for summer cooling.

DETROIT LUBRICATOR COMPANY

DETROIT, MICHIGAN, U. S. A.

Division of American Radiator and
Standard Sanitary Corporation

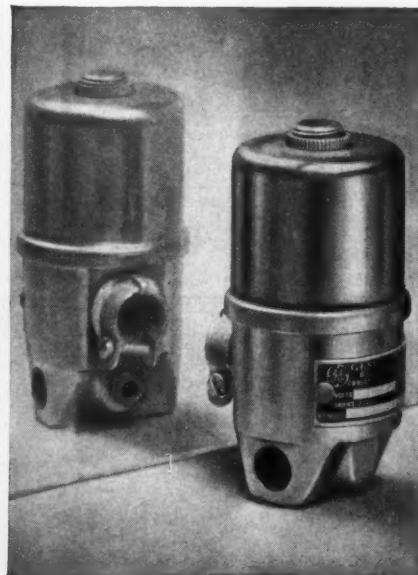
DEPENDABLE ELECTRIC ACCESSORIES BUILD YOUR PROFITS



**The RIGHT MOTOR
for FANS and BLOWERS
QUIET . . . CARE-FREE . . .
EASILY INSTALLED**

For belt-driven fans and blowers requiring up to 1/4 hp., you can't go wrong if you select the G-E Type KH split-phase motor (illustrated).

It's dependable. It's easily installed because of its simplified, built-in terminal box, and because of its slotted base, which reduces the adjustment of belt tension almost to a matter of seconds. Add to these a lubrication system that provides *once-a-season* oiling, drip-proof end flanges that keep maintenance down by keeping undesirable materials *out*, and cushioned-power rubber mounting, and you have an equipment "buy" that's built to last.

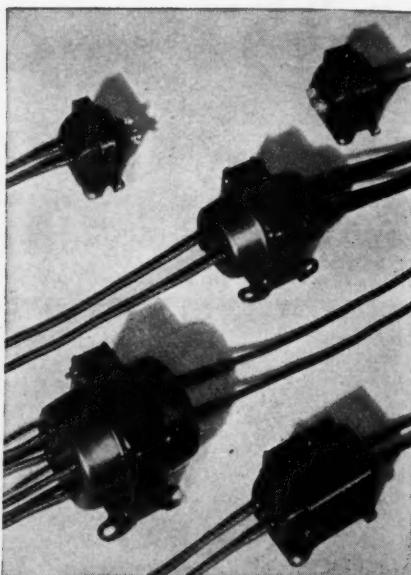


**NEW, electrically operated
VALVE
SMALL . . . COMPACT . . .
LOW-PRICED**

Ideally suited to air-conditioning needs, this new electric valve will handle water or low-pressure steam quickly, easily, and economically, by remote control.

It provides positive operation over a wide range of pressures and temperatures. It is economical—it uses only 7 1/2 watts at 110 volts, 60 cycles. Its parts are sealed in steel—no stuffing box. A handy, built-in terminal box saves installation expense. A convenient metering pin provides 50-per-cent flow regulation—no extra valve is needed.

If you have a large task for a little valve, this valve will save you money.



**CASH IN ON THE
COMPLETE LINE OF
G-E CONTROL
TRANSFORMERS**

Small solenoids, relays, motors, lamps, and similar accessories needed for an air-conditioning installation often must be operated at various voltages—stepped down from the lighting circuit for safety, convenience, and simplicity of wiring.

There are standard G-E control transformers for many applications; your requirements for special voltages can be economically and quickly met from an extensive line of standard parts. May we send you information about these transformers?

To maintain and protect your reputation for service and dependability, it will always pay you to insist on the highest quality when buying electric equipment. For quality and correctness of design, order General Electric cable, wire and wiring devices along with your motors, controls, etc.

GENERAL  ELECTRIC

General Electric Company
Dept. 6C-201, Schenectady, N. Y.

Please send me the following publications, as checked:

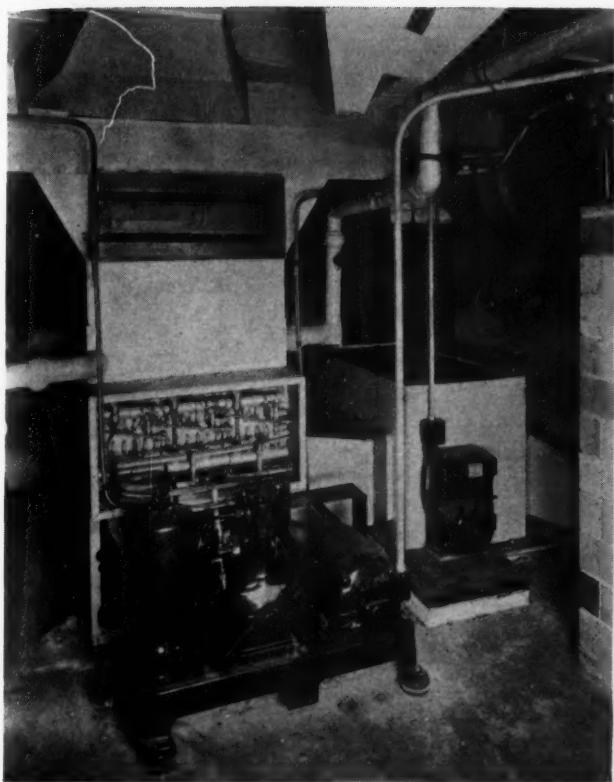
Name _____

Firm _____

Street _____ City _____ State _____

- GEA-1276A, Type KH Motors
- GEA-1847A, Solenoid Valves
- GEA-1358, Control and Signal Transformers
- Also, please place me on your mailing list to receive regularly your information service covering small motors, controls, transformers, etc., for air conditioning.

070-80



Two years ago The Detroit Edison Company sponsored the installation of cooling equipment in a residence located in a Detroit suburb. This residence is about the same size as the University of Illinois Research Residence, but the total space cooled was considerably larger, consisting of four rooms each on the first and second floors and a maid's room on the third floor; a total of nine rooms with a volume of 19,200 cubic feet. All openings are weatherstripped and the walls are insulated with Cabots Quilt and the ceiling with Balsam Wool. The winter heat loss of this house at a 70-degree differential is 93,000 B.t.u.

During the summers of 1932 and 1933 cooling was accomplished by the use of ice and the operating results were discussed in papers presented at the last two annual meetings of the A. S. H. & V. E. The ice equipment was replaced by a refrigerating machine and direct expansion cooling coil in June, 1934, and this equipment was operated during last summer.

Apparatus and Design

The cooling equipment consists of a two-ton refrigerating unit supplying Freon to a direct expansion, forced convection, cooling coil. The coil is placed in the main return air chamber of a conventional forced warm air heating system and no changes were made to the existing duct work except relatively minor ones to accommodate the coil. The general arrangement is shown in Fig. 1. The operation of the machine is controlled by a low voltage thermostat located in the dining room. This thermostat is wired to control the operation of a solenoid valve placed in the liquid line supplying refrigerant to the cooling coils. When the ther-

*Article based on a paper presented as a discussion of Professor A. P. Kratz's report to A. S. H. & V. E. meeting in Buffalo, N. Y.

Summer Cooling in a Detroit Residence*

By G. B. Helmrich

Detroit Edison Company

There is much misinformation on the subject of the cost of mechanical cooling for residences. The 1934 tests of the Detroit Edison Company are especially interesting and important because they give us definite cost figures for a typical residence. We call your attention to the operating data and costs.



Above—A closeup view of the cooling plant showing compressor, blower, coils and some of the duct system. The view of the house shows a typical frame structure exposed to sun and wind; weatherstripped and insulated.

mostat calls for cooling, the liquid valve opens and allows refrigerant to flow into the cooling coil. When the vapor pressure in the coil has built up to about 40 pounds, the low pressure control closes the starting contactor and starts the refrigerating machine, which action automatically starts the circulating fan. When the room temperature has been reduced to that of the thermostat setting, the liquid valve is closed and the machine "pumps down" until the suction pressure is reduced to about 7 pounds at which pressure the low pressure control stops the machine, but the fan continues to circulate air until stopped by a conveniently located manual control. The control diagram is shown in Fig. 2.

The system was placed in service on June 12, 1934, and operated for eighteen days for a total of 168 hours during the season. Had the system been available on June 1st, there would probably have been need for cooling on five additional days, according to temperature records. This would make a total of 23 days of artificial cooling for the entire summer.

A comparison of the principal operating data with that for the previous two summers, when ice was used, is shown in the summary of operating data. Two very significant comparisons stand out

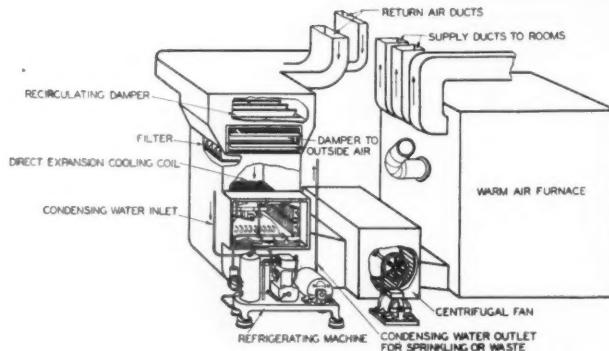


Fig. 1—Details of the cooling apparatus showing dampers, filters, cooling surface, compressor and blower as arranged in this test house.

in this summary; the hours of cooling per day of use are fifty per cent higher than in the previous summer, while the operating cost per hour of cooling is less than one third that for previous summers. The greater number of hours of use can be credited both to the ease with which the occupants of the home could start the cooling system and to the very low cost of operation. The net cooling accomplished by the machine was approximately the same as that accomplished by the use of ice in the two previous summers.

The performance of the cooling system was measured both by recording instruments and by special tests and the results of two of these tests are given in Table I and Table II.

TABLE I.
TESTS OF COOLING SYSTEM

Test of July 13, 1934.

Air Temperatures and Relative Humidity

Time	Outdoor			Indoor			Cooling Coil		
	Wet B.	Dry B.	Rel. H.	Liv. Rm.	Din. Rm.	Register Rm.	Ent. Rm.	Din. Rm.	Leav. Air
3:15 pm*	87°	78°	62.5%	80°	66.5°	67°	74°	65°	
4:00 pm	74.5°	90°	48%	...	...	...	74°	64.5°	
5:15 pm	...	...	...	77°	53%	65.5°	66.5°	74°	64°

Condensing Water:

Temperature of water entering condenser—62° F.
Temperature of water leaving condenser—83° F.
Quantity of water flowing through condenser—
2.17 g.p.m.

Heat rejected to cooling water—22,800 B.t.u. per
hr.

Cooling Load:

Latent Heat:

Moisture condensed from air—2 hr average—
3.87 lb. per hour.

Indoor Relative Humidity at start of cooling—
63%.

Indoor Relative Humidity 2½ hours later—
53%.

Latent heat load—3.87 x 1056=4100 B.t.u. per
hr.

Sensible Heat:

Air flow=1570 c.f.m.

1570 x 60 x .075 x 0.2375 (74-64)=16,900 B.t.u.
per hr.

Total Cooling Load:

16,900 sensible+4100 latent=21,000 B.t.u. per
hr.

*Cooling started at 2:45 pm.

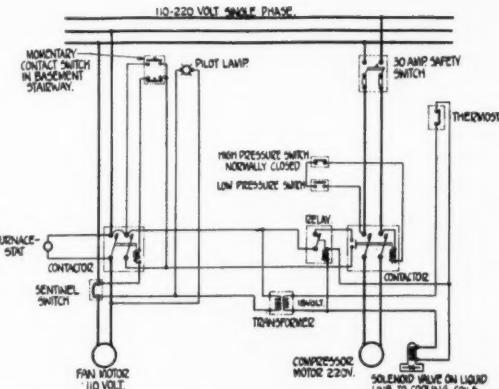


Fig. 2—Diagram of the control system used. The thermostat admits refrigerant to the cooling coils. The blower operates off of vapor pressure in the coil. (See text for explanation.)

TABLE II.

Test of July 24-25, 1934.

Air Temperatures and Relative Humidity

Time	Outdoor		Indoor		Upstairs		Cooling Coil	
	Dry B.	Rel. H.	Liv. Rm.	Din. Rm.	Rel. H.	S. Bed Rm.	Ent. Rm.	Leav. Air
July 24, 3:50 pm*	100°	26%	78.5°	...	59%	...	...	...
July 24, 6:00 pm	100°	...	79°	...	80°	75.5°	65.5°	
July 25, 10:00 pm	...	...	77.5°	...	52%	...	...	...

Cooling Load

Latent Heat:

Moisture condensed from air=5.06 lb. per hr.
5.06 x 1056=5,350 B.t.u. per hr.

Sensible Heat:

1570 x 60 x .075 x 0.2375 (75.5—65.5)=16,800
B.t.u. per hr.

Total Cooling Load:

16,800 sensible+5350 latent=22,150 B.t.u. per hr.

Note: No windows on either floor of the residence were opened during the thirty hour cooling period and no outdoor air was drawn in, the air being completely recirculated.

Test Results

These test results, together with observations made by the occupants, indicate that the cooling system had sufficient capacity to hold the downstairs temperature to an average value of 78 degrees F. and an effective temperature of 71 to 72 degrees. On the hottest day last summer, July 24th, when the outdoor temperature exceeded 100 degrees F. for a period of three hours, the first floor temperature did not exceed 79 degrees F. in the living room. As previous tests had shown that, without cooling, the indoor temperature would have risen to about 85 degrees F. under corresponding outdoor conditions, the cooling system can be credited with an average reduction of indoor temperature of 7 degrees. In addition to this reduction in temperature, the relative humidity was appreciably reduced. Indoor relative humidities at the start of cooling of the order of 67 to 71 per cent were reduced to 60 to 63 per cent at the end of two to three hours of cooling and the relative humidity at the end of the cooling periods was of the order of 50 to 55 per cent. The amount of moisture condensed from the air by the cooling coils varied between four and six pounds per hour on the days that tests were made.

(Continued on page 42)

*Cooling started at 3:50 pm July 24th and continued until 10:00 pm on July 25th—30 hr run.

Automatic Controls For Air Conditioning Systems

This article concludes the discussion of zone control systems which has been running since last December. In the three previous articles we outlined the advantages of zone control and discussed two specific variations of the basic principle. This article explains a third variation and gives a general summary of the whole idea.

System Number 3

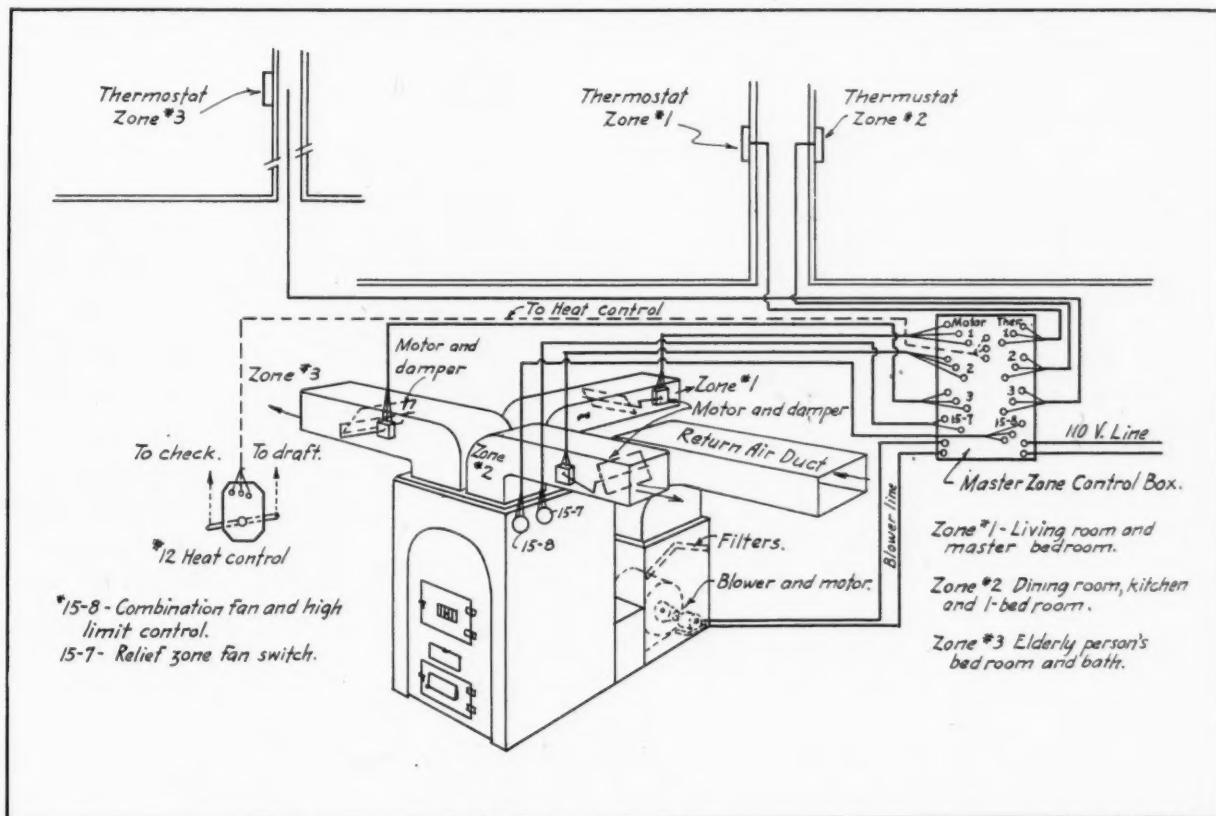
THE operating cycle for system 3 can be outlined thus: We have a relief zone. A level of temperature is maintained in the bonnet at all times by a fire control independent of the thermostats. Suppose that a zone calls for heat. The zone thermostat causes the zone damper to open; causes the fan to start. The fan should start immediately because we have a fan running temperature in the bonnet. We should be able to dispense with the low limit fan control, but such an instrument is valuable in case the fire dies out. We do not need a high fire limit control because the regular fire control handles this function. Our relief zone is controlled by a bonnet instrument which opens the relief zone damper and starts the fan should we get dangerous temperatures in the bonnet due to failure of our fire control or have a runaway fire.

In system number 3 we have changed our method of fire and fan control so as to maintain a level of temperature in the bonnet at all times and our fan will run immediately when any thermostat calls for heat. We have a relief zone where excess heat can go should our bonnet temperature reach a dangerous point.

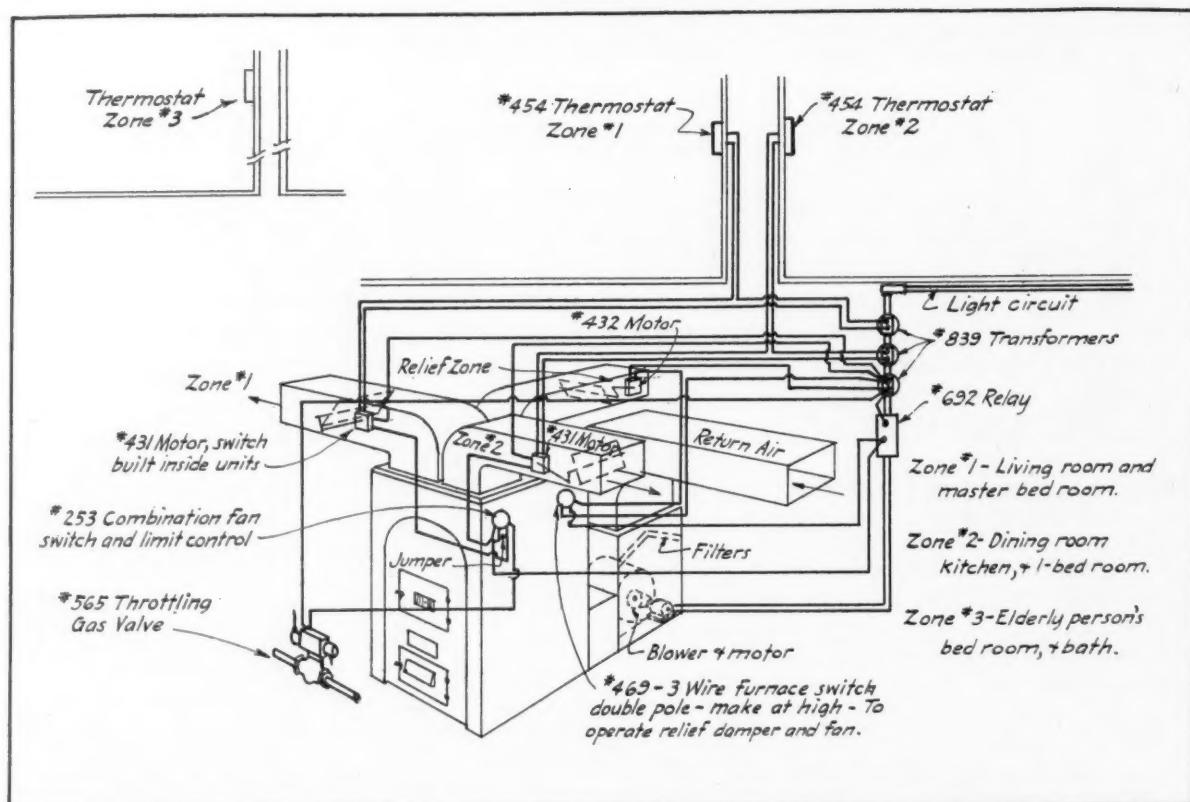
We need have little concern over the control of the fan because our zone thermostats will start and stop the fan and in the event that our bonnet temperature gets too low for comfort our "low limit" fan control cuts in and prevents the fan from running.

Our fire control is the real problem. Some of the best information on a control system wherein a constant level of temperature is maintained irrespective of the house demand is contained in the University of Illinois Research Residence report covering tests of control systems. Two different

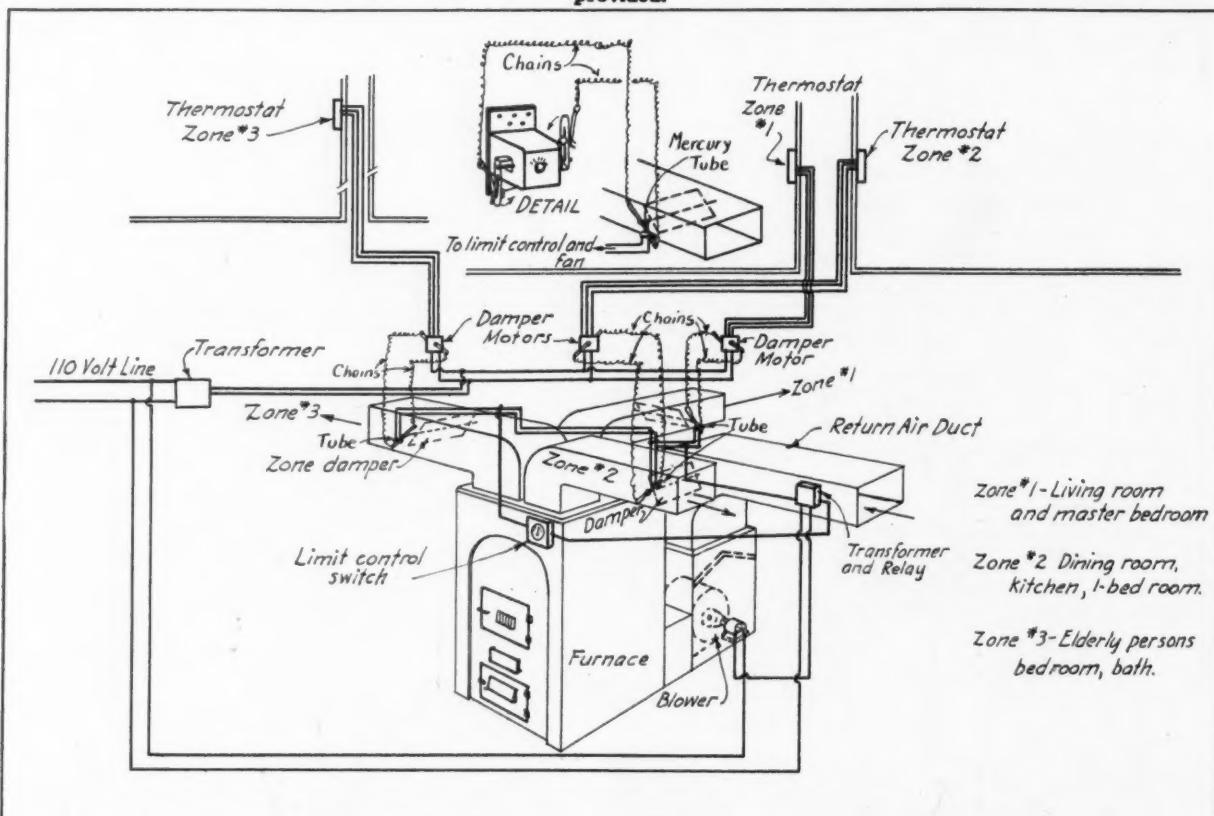
(Text continued on page 38)



Cook Electric Company offers a circuit using Zone No. 3 as relief zone due to the desirability of a higher temperature level in that zone. The circuit arrangement allows great flexibility in the selection of zone locations. Wiring facilities are extremely simple and practically mistakeproof. All wires are carried to a central panel where connections are plainly marked. Zone thermostats control the operation of the system through bonnet fan and high limit fire controls.



In the diagram above a relief zone has been used. Should temperatures get high enough to run the fan while all zones are satisfied, this relief zone opens and the fan starts, thereby dissipating the surplus heat and eliminating danger to the furnace. The thermostat for zone 3 is not wired in, but can be connected to its proper damper motor, by the same connection indicated for the other two thermostats. The apparatus shown is by Detroit Lubricator Company employing a two-bladed thermostat. The zone damper opens at the command of the room thermostat. The fan starts as soon as bonnet temperatures reach the fan running setting. The furnace draft opens on the low setting of the thermostat and closes at the high setting—two degrees higher. A safety control to prevent the fan blowing cold air is provided.



The wiring diagram above shows Automatic Products Company apparatus as used in the American Artisan Test House where a boiler is employed as a source of heat supply. The thermostats open the zone dampers through a remote motor. Mercoid tubes are placed on one arm of each damper. Thus when the damper opens, the tube makes contact and starts the fan. The fan runs so long as any damper is open. A low limit control is employed to stop the fan should register air temperatures get too cold. On the test house a part of one zone is always open and while no safety zone is actually employed it would be easy to place a relief zone control to run the fan should temperatures get too high.

Comparative Input of coal, gas and oil in terms of therms (100,000 B.T.U.)

Compiled by L. W. Millis, Secy., Security Stove & Mfg. Co., Kansas City, Mo. Prompted by a similar table by the National Coal Association.

This table is devised to show comparative fuel requirements when burned at various efficiencies. EXAMPLE: If one ton of 14,000 B.T.U. per pound coal be burned in equipment that will extract 50% of the heat in the coal, then 140 therms will be delivered at the canopy of the furnace or the nozzle of the boiler. If gas is burned in equipment that can extract 75% of the input it will require 187 therms.

If the gas contains 1,000 B.T.U. per cubic foot it will require 187,000 cubic feet.

If the gas has only 800 B.T.U. per cubic foot, it will require 234,000 cubic feet.

If oil of approximately 137,400 B.T.U. per gallon be used at 75% efficiency it will require 136 gallons of oil. If the coal cost \$10.00 per ton, the gas 50c per 1,000 cubic foot and oil 6½c per gallon, then the cost for coal would be \$10.00. For gas of 1,000 B.T.U. per cubic foot \$9.35. For gas with 800 B.T.U. heat content \$11.70 and for oil \$8.84. Hundreds of combinations of efficiencies and fuel prices can be readily calculated.

If efficiencies not shown in table are desired proceed as follows:

B.T.U. of coal times 2,000 pounds \div 100,000 B.T.U. = Therms in the coal. Therms in the coal times selected percent efficiency at which coal is burned = therms utilized in the coal. Therms utilized in coal \div by selected percent efficiency of gas = therms of gas required.

To find gallons of oil (137,400 B.T.U. per gallon or 1.374 therms) \div the therms of gas required at the same efficiency by 1.347 = gallons of oil required.

All efficiencies in table are at nozzle of boiler or at canopy of furnace.

B.T.U. Burned Therms

per lb. at Re-
Coal efficiency leased
"As of %
Re-
ceived"

			Gas Equivalent per ton.				Equivalent Gallon's oil per ton.				
			At Efficiencies indicated.				At Efficiencies Selected.				
			60%	65%	70%	75%		60%	65%	70%	75%
14,500	40	116	193	178	166	155	140	129	121	113	
	50	145	242	223	207	193	176	162	151	140	
	65	189	314	290	269	251	229	211	196	183	
	70	203	338	312	290	270	246	227	211	196	
	75	218	362	334	311	290	208	243	226	211	
14,000	40	112	187	172	160	149	136	125	116	108	
	50	140	233	215	200	187	170	156	146	136	
	65	182	303	280	260	243	221	204	189	177	
	70	196	327	301	280	261	238	219	204	190	
	75	210	350	323	300	280	255	235	218	204	
13,500	40	108	180	166	154	144	131	121	112	103	
	50	135	225	208	193	180	164	151	140	131	
	65	176	293	270	251	234	213	196	183	170	
	70	189	315	290	270	252	229	211	196	183	
	75	203	337	312	289	270	245	227	210	196	
13,000	40	104	173	160	149	139	126	116	108	101	
	50	130	217	200	186	173	158	146	136	126	
	65	169	282	260	241	225	205	189	175	164	
	70	182	303	280	260	243	221	204	189	177	
	75	145	325	300	279	260	237	218	203	189	
12,500	40	100	167	154	143	133	122	112	104	97	
	50	125	208	192	179	167	151	140	130	122	
	65	163	271	250	232	217	197	182	169	158	
	70	175	292	270	250	233	213	197	182	170	
	75	188	312	288	268	250	227	210	195	182	
12,000	40	96	160	148	137	128	116	108	100	93	
	50	120	200	185	171	160	146	135	124	116	
	65	156	260	240	223	208	189	175	162	151	
	70	168	280	257	240	224	204	187	175	163	
	75	180	300	277	257	240	218	202	187	175	
11,500	40	92	153	142	131	123	111	103	95	90	
	50	115	192	177	164	153	140	129	119	111	
	65	150	250	231	214	200	182	168	156	146	
	70	161	268	248	230	215	195	180	167	156	
	75	173	288	266	246	230	210	194	179	167	
11,000	40	88	147	135	126	117	107	98	92	85	
	50	110	183	170	157	147	133	124	114	107	
	65	143	238	220	204	190	173	161	148	138	
	70	154	257	237	220	205	187	172	161	147	
	75	165	275	254	236	220	200	185	172	161	
10,500	40	84	140	129	120	112	102	94	87	82	
	50	105	175	162	150	140	127	118	109	102	
	65	137	228	210	195	182	166	153	142	132	
	70	147	245	226	210	196	178	164	153	143	
	75	158	263	242	225	210	197	176	167	152	
10,000	40	80	133	123	114	106	97	90	83	77	
	50	100	167	154	143	133	122	112	104	97	
	65	130	217	200	186	173	158	146	135	126	
	70	140	233	215	200	187	170	156	146	136	
	75	150	250	231	214	200	182	168	156	146	

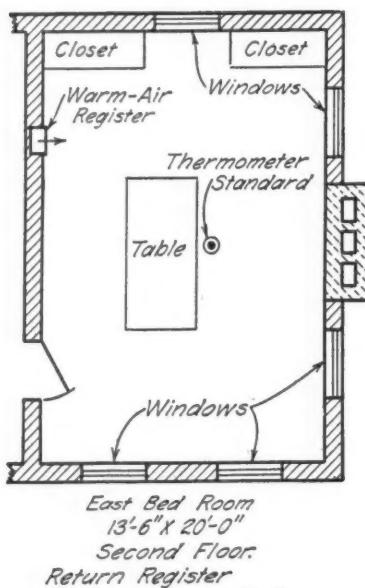


Fig. 1—Location of register with respect to exposed walls in East bedroom of the Research Residence.

Introduction

IN THE previous article on room air temperatures the effects of external weather conditions, room construction, and types of heating systems were considered in their relation to the air temperature gradients maintained in the room. The tests conducted in the Research Residence showed that with the forced-air heating system it was possible to maintain room temperature conditions in the "living zone" that were better than those possible with either the gravity warm air system, or "booster-fan" system. In addition, it was indicated that with the use of proper type registers it might be possible to maintain air temperature conditions that most nearly approached the ideal of a uniform air temperature from floor to ceiling. In the following discussion, therefore, the results obtained with various types and with various locations of registers will be considered in greater detail.

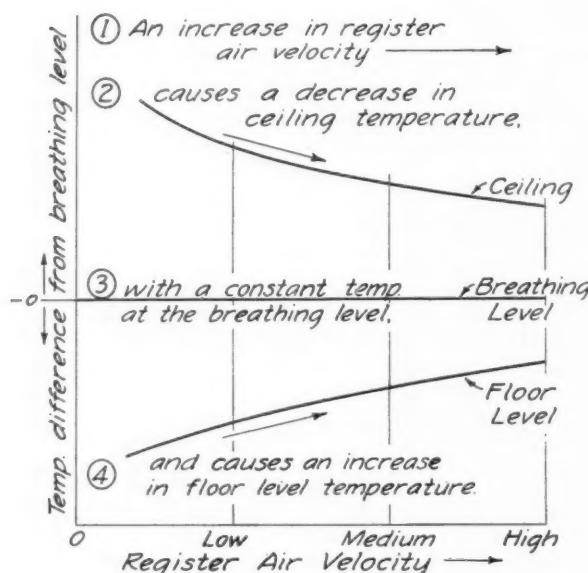


Fig. 2a—Explanatory diagram for air in studying Fig. 2b.

Forced Air Heating Facts From The Research Residence

Registers for Forced Air

By S. Konzo

This article, the fifth of the series, and succeeding articles on forced-air heating research carried on at the Warm Air Research Residence in Urbana, Illinois, are based to a large extent on material published in Bulletin 266 of the Engineering Experiment Station of the University of Illinois. The author has also extensively drawn on additional sources for these discussions.

Arrangement of Registers Tested

Special tests were conducted with various types and locations of the warm air register in a forced-air system. The tests were conducted in the East Bedroom and the test arrangement was as indicated in Fig. 1. For each register arrangement a sufficient number of observations was made to include a wide range of outdoor temperatures. The temperatures at the different levels were plotted against the difference between the outdoor temperature and the temperature at the 5-foot level in the room. All comparisons were made by reading the temperatures from these curves at a difference of 45 degrees F., corresponding to an outdoor temperature of 25 degrees F.

Tests were run with continuous fan operation over a range of average register air velocities of from 130 to 800 feet per minute for six arrangements, namely:

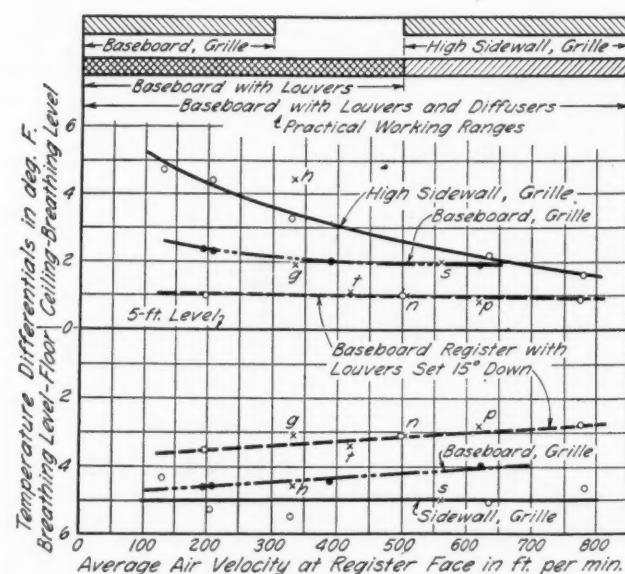


Fig. 2b—Room temperature differentials with baseboard and high sidewall registers in forced air system.

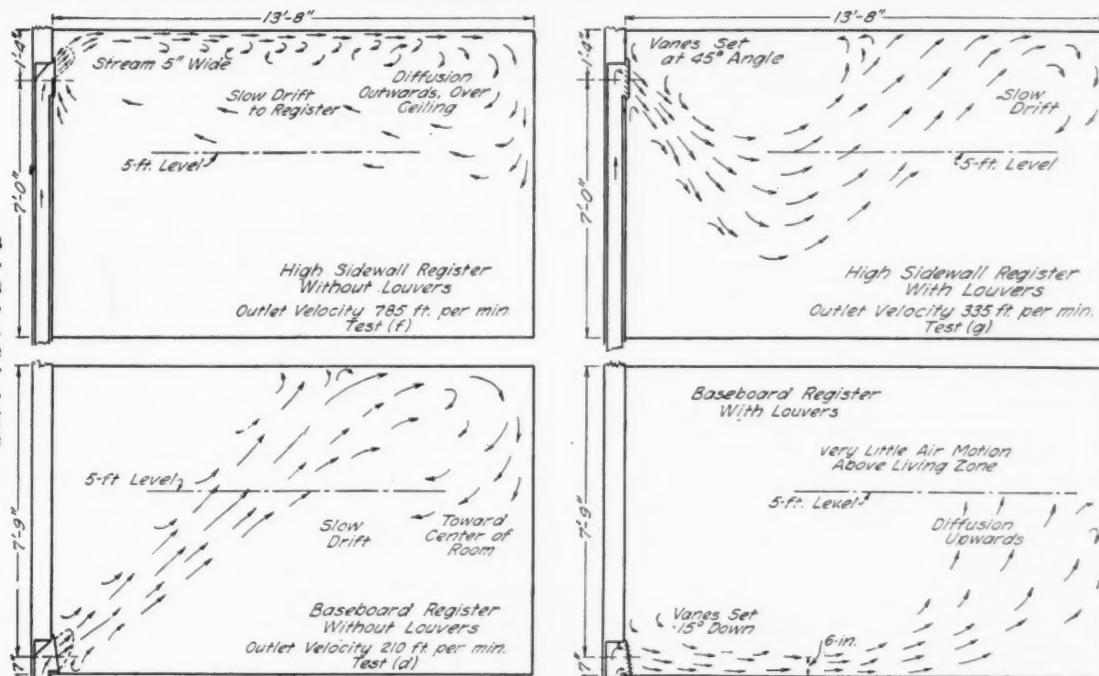


Fig. 4—Diagrams showing air circulation in room with four types of register air outlets. Arrows indicate the direction of air flow and concentration of heating effect within the room.

- A baseboard register with a common type of grille.
- A high sidewall register with a common type of grille.
- A high sidewall register equipped with louvers.
- A baseboard register having deflectors or louvers set 15 deg. downward from the horizontal.
- A baseboard register with diffusers used in addition to the louvers.
- A high sidewall register with diffusers.

For the tests listed under item (e) the register face was always blocked at the top, thus leaving the bottom of the outlet approximately one inch above the floor line.

In Fig. 2b curves are shown giving the relation between the average register air velocities and the difference in temperatures between the 5-foot level and the floor, and between the ceiling and the 5-foot level. As an aid in studying the data presented in Fig. 2b, a simplified diagram of the essential data is shown in Fig 2a. The four essential features of Fig. 2a are indicated by the encircled numbers 1, 2, 3, and 4:

Item number 1 indicates that register air velocities increase as one moves to the right of the figure.

Curve number 2 represents ceiling air temperature.

Curve number 3 represents breathing level temperature.

Curve number 4 represents floor air temperature.

The approach of curve 2 to curve 3 indicates a lessening of the temperature difference from ceiling to breathing level. Similarly, the approach of curve 4 to curve 3 indicates a decrease in temperature difference from floor to breathing level. If no temperature stratification existed in the room at all, then curves 2, 3, and 4 would coincide.

Fig. 2b is essentially of the same nature as the explanatory diagram, Fig 2a, except that instead of a single curve for ceiling temperature, three sep-

arate curves are shown representing three different register arrangements. Similarly three curves for floor temperatures are indicated for the three different register arrangements tested. With this explanatory note on the method of "reading the curves" shown in Fig. 2b, a detailed discussion of the different tests will follow.

a) Baseboard Register (Common Type Grille)

From Fig. 2b, it may be noted that, with the baseboard register having the standard grille, as the velocity of the air was increased the temperature in the upper part of the room above the 5-foot level decreased slightly and the temperature of the air near the floor increased. However, not enough improvement was shown to warrant the use of high velocities with the accompanying objectionable air currents in the room. The range of practical velocities with this arrangement, as shown in the upper part of Fig. 2b, is from 100 to 300 feet per minute.

b) High Sidewall Register (Common Type Grill)

It is evident that the high sidewall register with the standard grille at low velocities gave high temperature for the air above the 5-foot level. At a velocity of 200 feet per minute the temperature of the air 4 inches below the ceiling was 74.5 degrees F. as compared with 72.4 degrees F. for the baseboard register with the same type of grille. The temperature of the air near the floor was lowest with the high sidewall register.

Also the temperature of the air near the floor seemed to be more sensitive to outside influences, such as wind movement, for the high sidewall arrangement than it was for the other arrangements, as shown by the irregularity of the points on the lower curve for the high sidewall register. As the velocity of the air was increased with the high sidewall register, the temperature in the upper part of the room materially decreased, while the temperature near the floor remained constant.

A velocity of from approximately 500 to 625 feet per minute had to be used with the high sidewall register in order to obtain the same difference in temperature between the ceiling and the 5-foot level as that given by the baseboard register with the same type of grille operating over the practical velocity range of from 100 to 300 feet per minute. Even in this case the temperature near the floor was approximately 0.5 degrees F. lower with the high sidewall register than it was with the baseboard register.

c) High Sidewall Register with Louvers

The point (g) in Fig. 2b indicates that, from the standpoint of cool ceiling and warm floor, the high sidewall register equipped with louvers to deflect the air 45 degrees downward gave very good results when the fan was operated continuously. However, the current of warm air directed into the room was such that it would strike the head and shoulders of an individual standing or sitting in front of the register, and the arrangement might prove objectionable for this reason.

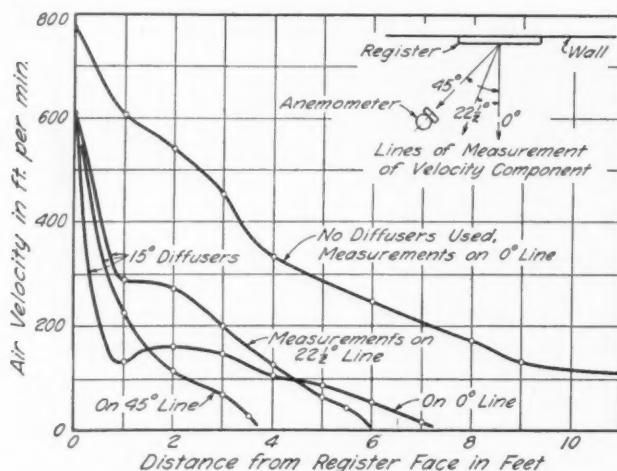


Fig. 3—Air velocity gradients for baseboard register equipped with louvers and diffusers.

This arrangement was also tested with the fan operated intermittently, and the results are shown as point (h) in Fig. 2b. Comparing points (g) and (h) it is obvious that with this arrangement any gain brought about by increased velocity with continuous fan operation was immediately cancelled when the fan was operated intermittently. The temperature in the upper part of the room was increased and that near the floor was decreased. If this is representative of what would occur with all arrangements of the high sidewall register, then more stratification of the air is to be expected with intermittent than with continuous fan operation.

d) Baseboard Register with Deflectors

From Fig. 2b it is apparent that the best arrangement consisted of a baseboard register equipped with louvers to deflect the air downward 15 degrees from the horizontal. Over the whole range of velocities the temperature difference between the ceiling and the 5-foot level was only 1.0 degree F., and the difference between the 5-foot level and the floor was only from 2.8 to 3.5 degrees

F. The most significant aspect is the gain in the temperature of the air near the floor and, together with this, the total temperature difference of 4.0 degrees F. between the ceiling and the floor may be considered as exceedingly favorable.

No difficulty with objectionable air currents was experienced until the register air velocity was well above 500 feet per minute. A study was therefore made of the air velocity across the room and directly in front of the register. This study was made with a velocity of 790 feet per minute for the air leaving the register, and is shown as the upper curve in Fig. 3. At a distance of 5 feet in front of the register the velocity had decreased to 300 feet per minute. Velocities within 5 feet of the register were noticeable, however, and it is considered advisable to limit the practical operating range for this arrangement to register air velocities below 500 feet per minute.

The baseboard register with louvers was also tested at a velocity of 420 feet per minute with the fan operated intermittently, and the results are shown as point (t) in Fig. 2b. In this case practically no change in the temperature gradient obtained with continuous fan operation was observed. This may be explained by the fact that, with the louvered register, even at the low register air velocities accompanying gravity action, no marked stratification occurred.

Some question arose as to whether it would be better to place a narrow register, which could be used in connection with high velocities with this deflector arrangement, in the baseboard with the bottom as near the floor as possible, or above the baseboard with the bottom of the register frame joining the top of the baseboard. The test shown by point (n) in Fig. 2b was therefore run with the lower part of the register face blocked instead of the upper. The location of point (n) indicates that no difference in the results was obtained with the register blocked at the top and at the bottom.

e) Baseboard Register with Diffusers and Louvers

The fact that louvers deflecting the air from the horizontal proved advantageous suggested the possibility that additional diffusers arranged to deflect the air in both directions from a central vertical plane would result in further improvement. These diffusers were added to the arrangement in which the louvers were set at 15 degrees with the horizontal, and the diffusers made angles of 15 degrees with the vertical. The result of one test made with this arrangement is shown as point (p) in Fig. 2b.

From the standpoint of cooler ceiling and warmer floor no material gain resulted from the addition of the diffusers. However, the diffusers were very effective in eliminating air currents in the room and extending the range of allowable velocity at the register face. As shown in Fig. 3, when set at an angle of 15 degrees with the central vertical plane they reduced the velocity to a maximum of 200 feet per minute at a distance of 3 feet in front of the register, when this velocity was measured on a line making an angle of 22½ degrees with the central vertical plane. As measured on a line at 45 degrees with the central vertical plane the velocity was reduced to 200 feet per minute

within a distance of 1.5 feet in front of the register. Within a distance of 4 feet in front of the register the maximum velocity was observed on the $22\frac{1}{2}$ degrees line because, of the measurements made, this series most nearly corresponded with the angle of 15 degrees at which the diffusers were set.

f) High Sidewall Register with Diffusers

The same arrangement of diffusers was tested on the high sidewall register and the result is shown as point (s) in Fig. 2b. No material reduction in the temperature near the ceiling or gain in the temperature near the floor was obtained. Since air currents in the part of the room above the heads of the occupants are of no serious consequence, there seems to be nothing to recommend the use of diffusers in a high sidewall register.

In any case the use of both louvers and diffusers added somewhat to the resistance to air flow at the register face. The added resistance may be allowed for in the design of the system, and the

BASEBOARD REGISTER-PLAIN GRILLE

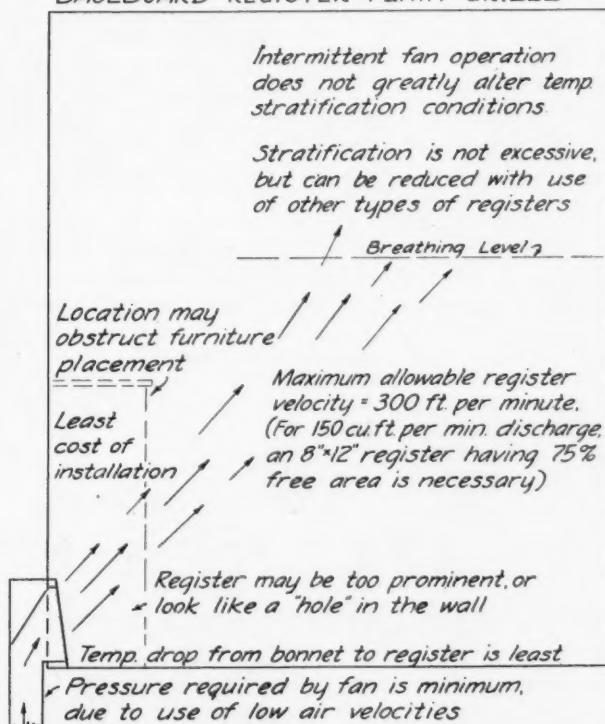


Fig. 5—Diagram showing characteristics of baseboard, plain grille register.

advantage of better air distribution should more than offset the disadvantage of somewhat increased pressure at the fan.

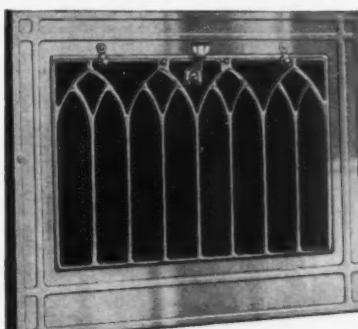
g) Smoke Studies of Room Air Circulation

Fig. 4 represents diagrammatically the results of smoke studies made with four of the register arrangements. With the high sidewall register without louvers the air tended to stratify in the upper part of the room. A thin stream moved over the ceiling to the outer wall of the room and practically all of the circulation occurred above the 5-foot level. It required comparatively high velocities at the register face in order to project the air to the outer wall with sufficient force to overcome the stratification. Fig. 4 shows that the addition of



Many a strong man has grown fretful and chewed his finger nails somewhat short of the elbows after constantly being confronted in every room in the house, day after day, by ugly faced baseboard registers—the imposition of some installer who figured that registers were just registers. And imagine what it has done to the women who of necessity must look at them twice as much as do their lesser halves!

Moral: There are numerous people to whom the presentation of a well-designed register like the H. & C. No. 110 shown below would create a favorable impression for your entire proposal—perhaps make the difference between a sale and a near-sale. So take your registers seriously, talk them, make them go to work for you. The first step in the right direction is to standardize on H. & C., the most complete line of fine registers to be found anywhere.



No. 110
BASEBOARD REGISTER

This register because of its attractive face design, harmonizes with practically any type of interior, and as a consequence has become the most popular baseboard register in America.

For those installers who prefer to lap the stack-head over the frame, we offer the No. 120 Series, with the same attractive face design.

HART & COOLEY MFG. CO.

CAST AND
STEEL

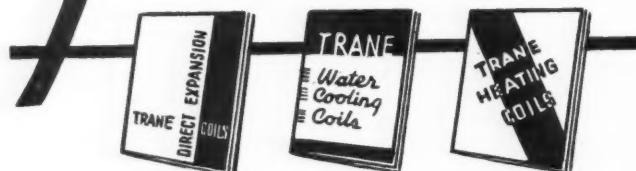


WARM AIR
REGISTERS

GENERAL SALES OFFICE 61 W. KINZIE STREET, CHICAGO

You ...

CAN BUILD A BETTER
AIR CONDITIONING
REPUTATION WITH
TRANE COILS.



Your reputation in Air-Conditioning is being made now. Use proved Trane Coils to build for the future.

COILS FOR DIRECT EXPANSION OR WATER COOLING

Trane builds Coils for both direct expansion systems and for use with cold water or brine as the cooling medium. There is a coil of the proper size and type for any heat transfer application. You will do well to thoroughly investigate the possibility of using Trane Coils on your residential or commercial installations.

LOW PRICE AIR-CONDITIONING IN CITY WATER MAINS OR WELLS

If city or well water is available during the warm months at temperatures below 60° you will find that air conditioning is at least 30% lower in cost than the average individual believes. If you are located in such a city the bulletin on Trane Coils for water cooling will be of great interest to you.

YOU CAN EASILY LEARN TO SELECT PROPER COILS

Trane Coil Literature has been prepared to make coil selection easy. Send for your copy now and find how easy it is to select the proper coils to insure real satisfaction on your air conditioning installation.

The Trane Company, La Crosse, Wis.
Please send the following coil bulletins:

- Direct Expansions
- Water Cooling Coils
- Blast Heating Coils

Name

Company

Street

City State

the louvers to the high sidewall register effectively eliminated stratification, but the rather high velocity current of air directed downward toward the center of the room would probably prove undesirable to the occupants.

With the baseboard register without louvers the circulation of the air in the room was more general, and high velocities were not required to overcome the effect of stratification. With the louvers and diffusers used in connection with this register the air circulation was even more general, and any appreciable current of air was confined to within about 6 inches of the floor, where it was not objectionable.

HIGH SIDEWALL REGISTER

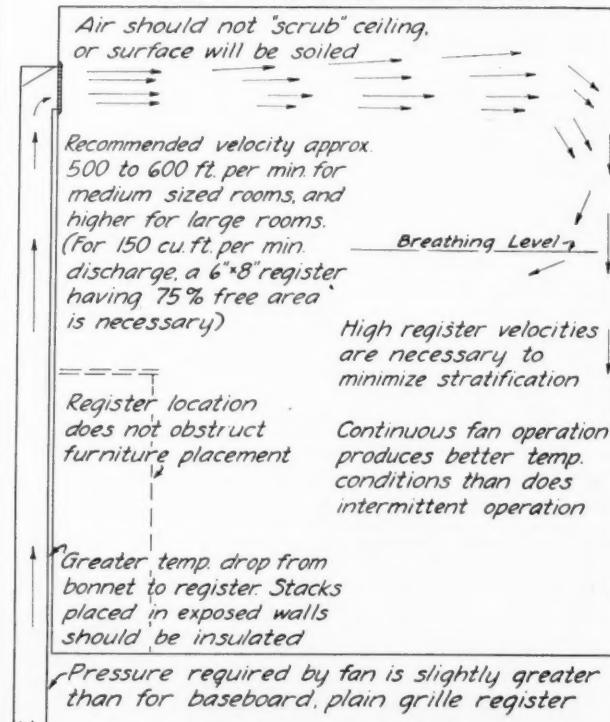


Fig. 6—Diagram showing characteristics of high sidewall register.

Summary of Research Residence Tests

The following conclusions may be drawn as applicable to the general type of room in which the tests were made:

(1) High sidewall registers with the common type of grilles when operated with low air velocities comparable with those practical for baseboard registers, cause excessive stratification of the air in the room, resulting in high air temperature in the part of the room above the 5-foot level.

(2) High sidewall registers with the common type of grilles should not be used with the average velocity of the air at the register face less than 500 feet per minute.

(3) Deflectors or louvers at the register face of high sidewall registers, set to direct the air at an angle of 45 degrees downward, overcome stratification of the air in the room, but may produce objectionable air currents in front of the register.

(4) The use of vertical diffusers in addition to the horizontal louvers in connection with high sidewall registers is of no material advantage.

(5) Intermittent fan operation in connection with high sidewall registers results in greater strati-

fication of the air in the room than that occurring with continuous fan operation.

(6) Intermittent fan operation in connection with baseboard registers equipped with louvers set

BASEBOARD REGISTER WITH LOUVERS.

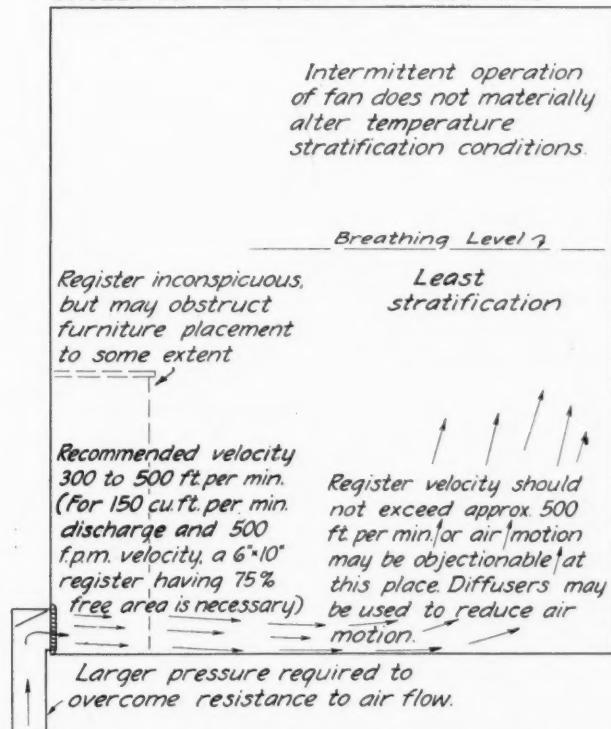


Fig. 7—Diagram showing characteristics of baseboard register with louvers.

at 15 degrees downward does not result in greater stratification of the air in the room than that occurring with continuous fan operation.

(7) Baseboard registers with the common type of grilles should not be operated with air velocities at the register face greater than 300 feet per minute.

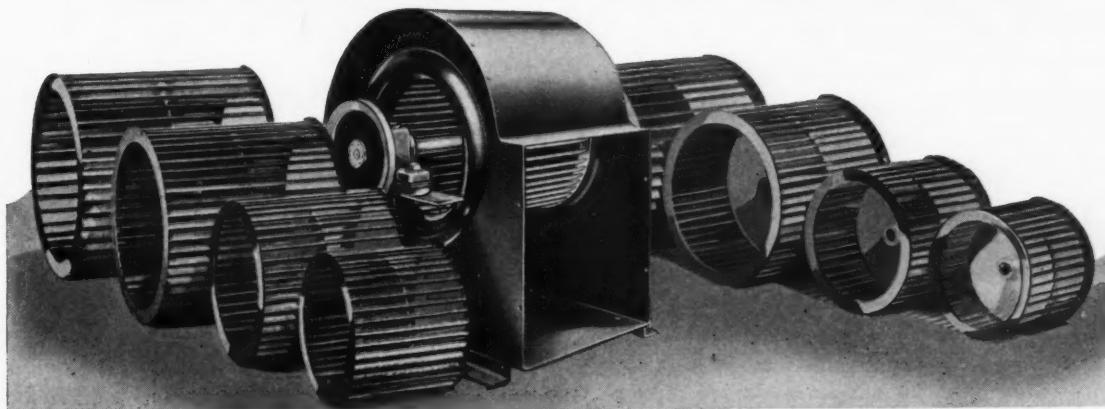
(8) Baseboard registers with louvers at the face set downward at an angle of 15 degrees with the horizontal effectively eliminate air stratification in the room, and permit the use of air velocities at the register face as high as 500 feet per minute without the air currents becoming objectionable.

(9) With a baseboard register the addition of diffusers to deflect the air outward 15 degrees from a central vertical plane and downward 15 degrees below the horizontal does not materially reduce the air temperature near the ceiling or increase it near the floor, but it does permit the use of air velocities at the register face as high as 800 feet per minute without the air currents becoming objectionable.

High Sidewall or Baseboard Registers?

It is not proper to conclude from the preceding discussion that only one type of register is recommended for all installations, under all circumstances. The register type or location to be used should be chosen to fit the requirements of each particular installation. The brief summary presented in Figs. 5, 6, and 7, of the advantages and disadvantages of each type of register may be of aid in reaching a decision as to the best register location.

THE NEW B. & B. BLOWER



Same Standard Quality at Reduced Prices!

These new Bishop & Babcock Blower Fans are die formed, welded, and hot galvanized. They are designed to eliminate inlet restrictions; and every wheel is given a static and dynamic balance on special machines designed for this purpose. These wheels run absolutely true at all speeds.

Fan housings are of heavy gauge sheet, die formed and welded construction. Inlets are streamline in shape without sharp edges or corners. Air outlets are designed for free flow, with no restriction so that uniform distribution is obtained without baffles.

THE BISHOP & BABCOCK SALES CO.
CLEVELAND OHIO

MAIL THIS COUPON

The Bishop & Babcock Sales Co.,
Cleveland, Ohio.

Gentlemen: Send me complete information on the new low priced B & B Furnace Blowers and fan wheels.

Name

Address

City..... State.....

Atten. of..... A-4

TEN ADVANTAGES Are Ten Reasons Why You Can Sell DEXTER HEAT VALVES!

1. Effectively lowers interior temperatures of any building—even in hottest weather.
2. Consumes no power whatever.
3. Stormproof—rain or snow cannot enter building.
4. Damper easily operated from building interior.
5. Felt strips on damper prevents heat loss in winter.
6. No parts that will wear or get out of order.
7. Wire screen keeps out birds and leaves.
8. Inconspicuous—blends with any architecture.
9. Easily and quickly installed.
10. Made of high quality heavy gage materials.

Home modernization loans and publicity have made money available and placed prospects in a receptive mood—it's one grand opportunity for you to make a lot of money—write for full information.

The Swartwout Company

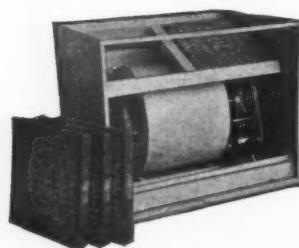
18615 Euclid Ave. Cleveland, Ohio
and all principal cities

The Swartwout Rotary Ball Bearing Ventilator for Industrial Ventilation is another money maker—ask for full details.

**INSIST ON THE AIR PACKAGE!****MORE FILTERS**

1000 CFM

Longer Life
Better Cleaning
Greater Satisfaction



COMPLETE with Miles Automatic Louvres or Minneapolis Furnacestat—Your Choice.

New Low Price—Only \$55.00

Net F. O. B. Cleveland

FILTERED AIR! Open the back to circulate the cooler air from for the SUMMER!

the basement.

AND—a money back guarantee of complete satisfaction.

Successor to the
Warm Air
Furnace Fan Co.



1935 W. 114th St., Cleveland, Ohio

Automatic Controls

(Continued from page 29)

variations of this basic principle were charted with the following results:

Research Residence Tests

The first system controlled the fire by a bonnet instrument while the fan was controlled by the room thermostat. The fire control was set so that two regions of temperature were available. These regions were known as "A" in which region the damper was closed and region "B" where the damper opened. Whenever the bonnet air temperature fell within region "B" the damper opened and the temperature rose. The system proved satisfactory except that in mild weather more heat than necessary was generated resulting in over-heating rooms subject to gravity flow of air. To overcome this the university suggests that the fire control be selected so that the two temperature regions can be shifted upward or downward—lowering the entire range in mild weather and raising it in severe weather. With such an arrangement close control can be maintained and little, if any, excess heat generated.

The second variation included two additional changes. In this second system the bonnet instrument opened and shut the damper maintaining a level of temperature, but the fan could not run while the damper was opened. In this system it was found that the fan could run without the damper opening, especially in mild weather. In severe weather, however, the fan quickly exhausted the heated air and stopped. Then the damper opened, while the fan was idle. The bonnet temperature rose, the damper closed and the fan started. When a fire control having 40 degrees of differential was used the fan waiting period was too long with the result that the house cooled several degrees. When a 15-degree differential was used the fire quickly brought up the temperature, the damper closed and the fan started. The result was frequent openings and closings of the damper and frequent cycles of fan operation. However, the range of the fire control had to be adjusted for every change in outside weather in order to prevent over-run on gravity flow. Such a system very likely will not work in a zone job because our fan start and stop and draft damper openings and closings would get all mixed up.

This variation was modified to include a make and break circuit so that the damper always closed whenever the fan stopped even though the bonnet air temperature was not within the region where the damper remained open. While this system maintained a level of temperature in the bonnet, at the same time the fire was also more or less controlled by the room thermostat because on the room temperature rising cycle the damper was closed when the fan stopped. If the fan remained idle the damper would open when bonnet air temperatures fell into zone "B" and the damper would remain open until bonnet air temperatures rose to region "A" if the fan did not cut in during the period.

These reports from the Research Residence show that a system which maintains a level of temperature in the bonnet can be used providing proper means are supplied to raise and lower this level ac-

PEERLESS . . .



AUTOMATIC AIR CONDITIONING UNITS

A perfectly balanced unit . . . furnace and blower engineered by Peerless to form a perfect combination. Every part designed and manufactured for greater efficiency and durability. Peerless is the most economical unit on the market, both from the standpoint of original investment and cost of operation . . . its beautiful appearance is just another of its many sterling and outstanding selling points. Compare this Peerless Unit . . . and you will find it offers your customer more dollar for dollar value than any other . . . and its low price will create many additional prospects for complete air conditioning units.

Now is the time to get this business and to build your sales and profits with Peerless Products.

Write for your copy "More Comfort Without Knee Action."

WE DO NOT SOLICIT OR SELL TO
MAIL ORDER HOUSES

THE PEERLESS FOUNDRY CO., INC.

INDIANAPOLIS, INDIANA

**A GENUINE
MASTER REGULATOR**

only
\$13.50
to dealer

Type B-22 Two-Position
New Damper Regulator
Made by the Manufacturers of
the famous Type B-144,
the original gradual control
heat regulator.

Accurate, quiet, attractive.
Worthy of a mansion but
priced within the reach of
the modest home owner.
Easy to install. Will outlast
the heating plant.
Listed as standard by
Underwriters Laboratories. Write today for full details.

WHITE MFG. CO.
2362 University Ave.,
St. Paul, Minn.

**MASTER
HEAT REGULATOR**

OPPORTUNITY for DEALERS

LINK-BELT makes available to dealers in certain territories a business opportunity such as has not been possible in a long time.

The market is at about 1% of saturation. All owners of heating or process steam plants up to 300-H.P. are prospects. With the larger jobs the fuel savings exceed the payments on the equipment.

The line is automatic under-feed stokers, in 13 sizes,

built and backed by a large old-established company, in business for 60 years.

Link-Belt finances deferred payment contracts for dealers, under a very attractive plan.

Advertising material, sales and engineering assistance given, plus cooperation on local advertising. Traveling representatives help you train men, close sales and survey jobs. Send the coupon for the complete story.

LINK-BELT COMPANY, Stoker Division

2410 W. 18th St. Chicago, Illinois
Send stoker book 1419 to:

Name

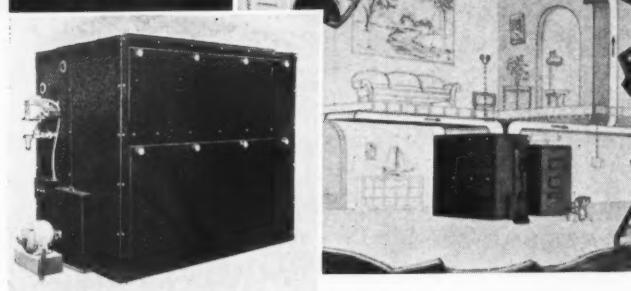
Firm

Address

(American Artisan 5251-B)



CLARAGE Duotherm
Complete Air Conditioning
For Fine
Homes



**A Deluxe Unit... Nothing Spared to
Make It the Best Obtainable**

Back of the Clarage Duotherm are sound principles of engineering. Back of this unit is almost a quarter century of experience in air handling and air conditioning.

A Duotherm provides COMPLETE AIR CONDITIONING. It cools and dehumidifies in summer; warms and humidifies in winter—all operations entirely automatic. Steam or hot water can be used as the heating medium; cold tap water or a direct expansion refrigerant for

CLARAGE FAN COMPANY, Kalamazoo, Mich.

cooling. Filtered conditioned air is distributed through ducts to all rooms in the home. The Duotherm is attractively finished in satin black with bright chromium trim—worthy addition to basement recreational rooms as shown at right above. Still another feature is quietness of operation.

Those people in your community who buy only the very best will be greatly interested in the Clarage Duotherm. Write us for Bulletin.

cording to the needs of outside weather. The system also gives instant response—for the fan can start as soon as the thermostat calls for heat.

These reports also suggest that a close differential be used so that the damper will open and close frequently thus generating just enough heat, but not too much.

These reports from the Research Residence cover a system where all ducts are open and gravity flow can take place. In a zone installation we do not have such an arrangement and when thermostats are satisfied all ducts are closed so there is no place for gravity flow to go.

Fire Control

This means that in a zone system where a level of temperature is maintained at all times our fire control presents a ticklish problem. We must have enough heat so that if several zones open at once the fan does not stop immediately because the heat is exhausted. We do not want too high a temperature for this wastes heat during fan stand-by periods. The practical solution lies in selecting a fire control instrument which can be set by the owner—lowering the temperature range in mild weather and raising the range in cold weather. Quite possibly this change might have to be made more than once a day if close control is wanted.

The saving feature is the fact already stated that observation shows in most zone systems in cold weather some zone is always calling for heat. Given enough time for experimentation we can select a temperature range which will satisfy several of the zones and still not generate so much heat that it will not all be used. We gamble on lack of uniformity in heat demand.

This brings up another point—the use of some kind of an instrument which would be placed outdoors and which will shift our fire temperature ranges automatically as outdoor temperatures change.

Summary

Reference has been made to several instruments such as zone thermostats, fan controls, fan "cut-off" and "fan-on," relief zone controls, fire controls, and safeties. We have mentioned these instruments as individual pieces of apparatus to avoid confusion. Obviously two or more of these functions may be incorporated in one instrument. Just how this works out will depend on the make of apparatus purchased. The wiring diagrams shown with the articles will give each manufacturer's suggested arrangement of apparatus and proper wiring with foot notes telling just how each group of apparatus functions.

The entire proposition of zone control might be summarized as follows:

1. Zone control offers a positive and easy way of compensating for outside conditions which affect variations indoors.

2. Zone control multiplies several times over the general sensitivity of our control system; makes our heating equipment more responsive to interior changes; affords means of obtaining better inside uniformity of temperature.

3. We have several choices of variations in system to meet peculiar conditions of every installation. We can have relief zones or no relief zone ac-

(Continued on page 44)

**ANCHOR
KOLSTOKER**

**Selling a Stoker
that Sells—**

Sell the Anchor KOLSTOKER—the stoker sensation of the year. Most complete line—meets requirements 94% all heating plants in use. Biggest opportunity for sales and profits. Developed by heating engineers. 70 years of experience behind it. Best-engineered stoker on market. Everybody wants automatic heat. Prospects easily sold on price, appearance, easy operation, economy, and performance. Outstanding in all features of stoker superiority.

**Fastest Growing
Business Today.**



**"10 Years Ahead
of the Field"**

**Make Big Profits Selling Stokers—Complete
Line Brings Biggest Opportunity**

Don't handicap yourself with an incomplete or inferior stoker line. Don't lose sales you should make. Make sure of big sales and profits with America's finest automatic coal burner. Complete line—22 sizes and models—burning capacities 20 to 2200 pounds per hour—cabinet types for homes, apartments, store-buildings, etc.; heavy duty industrial types for larger plants. Easily installed any furnace or boiler plant now in service. Tremendous opportunity. Write, phone, or wire.

ANCHOR STOVE and RANGE CO., INC.
NEW ALBANY ESTABLISHED 1865 INDIANA

HESS FURNACE AIR CONDITIONER BLOWER FILTER UNIT

BEAT COMPETITION!

Most furnaces are of conventional design, almost the same except for the name. Hess Furnaces are different in appearance and construction and excel in performance. You can beat the mail order concern and ordinary competition with the Hess line—different and better, priced as low as ordinary furnaces.

SALABILITY—MOST IMPORTANT

Under NRA, competitive prices to the dealer are very much alike. Quality and salability are therefore more important than ever. Hess furnaces are distinctively different with many features to talk about that mean easier selling and better profits for the dealer. Hess furnaces are rectangular in shape throughout—not merely a round furnace covered by a square casing.

WRITE FOR DEALER PORTFOLIO

HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE., Founded 1873
CHICAGO, ILLINOIS

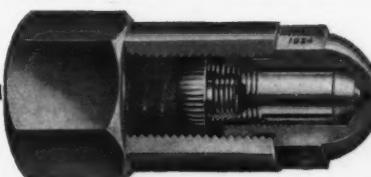


Fig. F-27

MONARCH OIL ATOMIZING NOZZLES

Monarch Fig. F-27 stainless steel nozzles are standard equipment on most pressure type domestic oil burners. Supplied in capacities from 1.35 to 30.75 G.P.H. at 100 lbs. and with 45, 60, or 80 degree spray angle.

Circular Letter No. 16

AIR CONDITIONING SPRAYS

For air conditioning work Fig. H-261 and Fig. H-256 $\frac{1}{4}$ " and $\frac{3}{8}$ " male pipe thread brass nozzles break water up into the finest spray possible using direct pressure. Capacities from .57 to 18.17 G.P.H. at 40 lbs.

Bulletin No. 18

MONARCH MFG. WKS., Inc.

3303 SALMON ST.
PHILA., PA.

AIR CONDITIONING CONTROLS

for
Domestic or
Commercial
Installations

MINNEAPOLIS-HONEYWELL Air Conditioning Controls govern all phases of this work, including heating, cooling, ventilating, humidifying or dehumidifying. There are controls for every application, each designed to accomplish its particular function with characteristic Minneapolis-Honeywell accuracy and efficiency. Minneapolis-Honeywell Regulator Company, 2701 Fourth Avenue South, Minneapolis, Minn. Branch and distributing offices in all principal cities.



Magnetic Shutoff Valve. Silent Solenoid valve with replacement seat and plunger. Especially designed for domestic air washers.

MINNEAPOLIS-HONEYWELL
Control Systems

Peerless
VENTILATING
EQUIPMENT



Spring weather
will bring great-
er profits to you
if you are ready to sell your customer
PEERLESS Ventilation. Have our cata-
log and prices on your desk.

Direct Drive Blowers
Exhaust Fans
Washer Units
Attic Fans
Motors

The Peerless Electric Company
Warren, Ohio
Name
Address
Bulletin 204

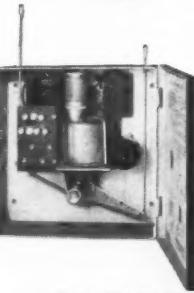
COOK CONTROLS

Only three pieces to this Complete Cook control for blower installations—Winter and Summer.

Thermostatic control of room temperature, bonnet temperature and circulation of air in summer.



Safety prevents excessive bonnet temperatures by starting blower regardless of thermostat setting.



Installation is very simple, three pieces of reliable equipment, color coded binding posts and wires.

Cost is surprisingly low.

Write for complete information.

COOK ELECTRIC COMPANY

2700 Southport Ave. Chicago

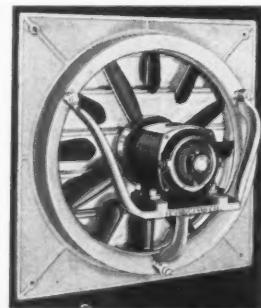
DAMPERS and DAMPER CLIPS

Cast Iron Damper
Warm Air Damper
Damper Clips
Bottom Clips

Reasonably Priced
Let us quote you on
your requirements



GRAND RAPIDS DIE & TOOL CO.
117 Michigan St., N. W. Grand Rapids, Mich.

INTERNATIONAL
Air Cooling

for

Homes and Apartments
Will Be
A money maker for you

Ask for Our New Sales Manual
No. 30. Sent Free.

Furnace, Ventilating and Sheet
Metal Companies Should Not Be
Without It.

INTERNATIONAL ENGINEERING INC., DAYTON, OHIO

Detroit Cooling Test

(Continued from page 28)

The performance of the cooling system throughout the summer was quite satisfactory to the occupants of the residence. The most severe test of the system was on the occasion when the compressor was operated continuously for a period of 30 hours, the outdoor temperature exceeding 100 degrees F. on the first day and 97 degrees F. on the second. Cooling was started at 4:00 P.M. on the first day and continued until 10:00 P.M. on the following day. No windows were opened during this cooling period and, on the second cooling day the upstairs temperature varied between a minimum of 73 degrees F. at 6:00 A.M. and a maximum of 79 degrees F. at 8:00 P.M. while the downstairs temperature did not exceed 78 degrees F. Although no outdoor air was drawn into the system, the occupants reported that the condition of the air in the sleeping rooms was very satisfactory. The reduction of the indoor relative humidity to a minimum of 52 per cent at the end of the cooling period was undoubtedly a large factor in producing such a satisfactory condition.

As objectionable operating noise can be very detrimental to an otherwise successful cooling installation, the compressor was tested for noise in a laboratory set up to determine its acceptability for resident use. The compressor is supported at the four corners by laminated cork and rubber pads which in turn rest directly on the basement floor. This very simple machine mounting proved very satisfactory from the standpoint of noise and, although the flexibility of this mounting permitted an excessive vibration of the compressor as at first designed, this trouble was eliminated later by having the compressor fly-wheel replaced with a specially balanced wheel designed to meet this situation. The noise of the machine was audible in the living room, but the occupants considered it in no way objectionable and likened it to the noise caused by a quiet operating oil burner. They did not feel that it was at all necessary to house the machine in a sound-proof box.

Conclusions

The summer's experience with this installation gives rise to certain observations which are deemed of sufficient significance to emphasize in this discussion.

1. In this climate it is quite feasible to cool a moderate-sized residence very satisfactorily with a two-ton refrigerating machine if the house is well insulated and awnings or blinds are used at the windows. Certainly a three-ton machine should be large enough even for a house which is only fairly well insulated.

2. Except under unusual circumstances, it is not necessary, nor even desirable, to supply outdoor air to a residential cooling system as natural infiltration will usually provide all the ventilation which may be required. Sleeping rooms can be satisfactorily cooled without introducing outdoor air.

3. Since the compressor capacity was somewhat less than would have been required to maintain what may be termed "ideal" conditions, there was no tendency toward over-cooling, and the room

thermostat could very well have been eliminated and the installation cost correspondingly reduced.

4. There was no objectionable lamp flicker caused by the running of the compressor although the number of fluctuations per second (compression intake cycle) was 9.7, which is rather low. The most troublesome frequency has been found to be about 6 or 7 fluctuations per second. Laboratory tests were made on three well known makes of compressors of 2 to 3-ton capacity, with fluctuation rates ranging from 9.7 to 39 per second, and it was found that no really noticeable light flicker would result under conditions usually found in residential lighting circuits.

5. A total operating cost of \$19.00 for a cooling season can certainly be considered very moderate, and should be no obstacle to the growth of this class of comfort cooling.

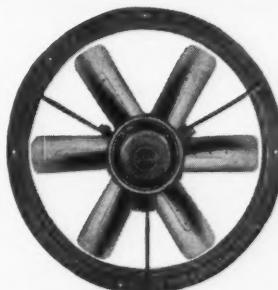
Cost Figures

SUMMER COOLING IN A DETROIT RESIDENCE

Summary of Operating Data for 1934 Season and Comparison with Summers of 1932 and 1933

	1932	1933	1934	2-Ton* Ref.
Cooling Medium	Ice	Ice	Machine	
Total number of degree hours above 85F during summer.....	529	1408	1345	
Number of days of artificial cooling...	22	22	18**	
Number of hours of artificial cooling..	135	134	168	
Number of hours of fan use only:				
Outdoor Air Cooling.....	57	120	6	
Recirculation	—	—	114	
Total number of hours of fan use.....	192	254	288	
Average number of cooling hours per day	6.1	6.1	9.3	
Electric Energy Used				
1932-'33—Ice Water pump and fan— Kw hr	94	142		
1934—Compressor and fan—Kw hr..			476**	
**135 Kw-hr for fan and 341 for com- pressor				
(Power required by Compressor— 2.04 KW)				
Condensing Water for Compressor				
Gallons of water per minute of opera- tion, average		2.07		
Total water consumption for season, gallons		20,920		
Cost of Cooling for Season				
Ice—1932-1933	\$45.60	\$30.60	—	
Electricity at 2 1/4 cents per kw-hr.	2.12	3.20	\$10.71	
Condensing Water at 20c M. gal.			4.18	
Total operating cost.....	\$47.52	\$33.80	\$14.89**	
Average cost per day of artificial cooling	\$ 2.16	\$ 1.54	\$ 0.83	
Average cost per hour of artificial cooling .....	.35	.25	.09	
*Kelvinator Condensing Unit				
Refrigerant—Freon				
2 cylinder compressor—400 rpm				
2 HP motor—220 volt—single phase repulsion induction				
*Direct Expansion Cooling Coil				
Size of Coil Bank—29"x25"x9 1/4" deep—4.41 sq. ft. face area				
Face velocity of air through coils when handling 1570 cfm—356 fpm				
Actual static pressure drop through coils 0.11 in. water				
Actual static pressure drop through entire duct system— 0.265 in. water				
Operating coil pressure—40 to 45 lb. per sq. in.				
Operating coil temperature—43 to 48F.				
**There were five cooling days in June when machine was not available; corrected cost for the entire season of 23 cooling days—\$19.05.				

PROPELLER FANS



Autovent "31 Series," a non-overloading fan for any ventilating purpose including explosion proof and acid-moisture proof applications. Capacities up to 38,000 CFM. Write today for Propeller Fan catalogue and prices.

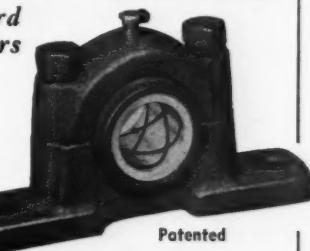
**AUTOVENT FAN
and BLOWER CO.**
1825 N. Kostner Ave., Chicago, Ill.

AN AUTOVENT PRODUCT

RANDALL PILLOW BLOCKS

—The Standard
of Leading Manufacturers

For a quiet operating and reliable installation always insist on Randall Pillow Blocks. With the ball machined and races ground insuring an accurate fit, they are trouble-proof and give years of satisfactory service. Write today for complete details and data contained in our new catalog—just out.



Patented

Self-Aligning
Self-Lubricating

RANDALL GRAPHITE PRODUCTS CORP.
609 WEST LAKE ST.
CHICAGO, ILL.

This Will Be a Humidifier Year



The Most
Important
Part of
Air Condi-
tioning is
Humidity

Get Our
New Low
Prices

ANNOUNCEMENT— NOW WE
have a low priced Humidifier for Steam and Hot Water
Plants. Everybody will want them. Write us. This is new
business.

Automatic Humidifier Co. Cedar Falls, Ia.



Patent Pending

INDEPENDENT "FABRIKATED"

ADJUSTABLE Directed
Air Flow REGISTERS
and GRILLES

For Forced Air Installations

Grille bars are made adjustable so that air flows can be directed upward or downward, or to the right or left, to any angle desired to 45 degrees. Send for catalogs.

INDEPENDENT REGISTER & MFG. CO.
3741 E. 93rd St. Cleveland, O.

Automatic Controls

(Continued from page 40)

cording to the general makeup of the house, fuel and the desires or needs of the family.

4. We can give the owner fully automatic control which he does not have to touch or we can give him an easily adjustable system which readily compensates for outside weather changes if the owner want to keep his system in close step to the weather.

5. While the basic operation of having zone thermostats admit air to the zone and shut off the air supply when the zone is up to temperature remains identical always, we have several choices of minor control over fire, fan, and general response.

6. With zone control we approach closely the ideal condition of keeping every room in the house independent—just as though each room had its own heating plant.

This article concludes the discussion of common types of automatic control systems for hard fuel. The articles began in June, 1933 and have appeared in practically every issue up to date. To our knowledge, this is the first time all information and relating facts have been gathered together in one series. Future articles will cover some variations and controls for cooling and automatic firing.



WRITE FOR
 COMPLETE DETAILS

LAU HEATING SERVICE, INC. - - Dayton, Ohio

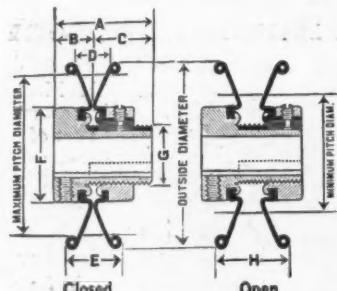
SUMMER COOLING

Night Air Cooling is the economical, effective method with the LAU NITEAIR BLOWER

Cool night air drawn through bedroom and first floor windows and exhausted through the attic will produce a cooling effect capable of maintaining the house from 10 to 15 deg. below outdoor temperatures. Night air cooling is the selling opportunity of the season . . . the eco-

nomical answer to the demand for summer cooling.

Go after it with the Lau NITEAIR Blower, made in three sizes from 3200 C.F.M. to 6000 C.F.M., mounted on specially designed rubber cradles to eliminate vibration, shipped completely assembled. Let us give you full information.



*Specially Adapted for Air Conditioning Units
 Write for Complete Details*

MAUREY MANUFACTURING CORP.
 29th & Wabash Ave. Chicago, Illinois

NEW MAUREY VARIABLE PITCH DIAMETER STEEL PULLEY

A steel pulley that will give a variation of as much as 30 per cent in speed when used with any fixed diameter pulley. Specially useful where load is small and speed is not frequently changed. For use with "A" or "B" belts.

SAVE on gas bills!

That's what everyone of your customers is trying to do—get gas bills down as low as possible. With a BARBER Gas Pressure Regulator on any gas appliance, gas bills will be much lower. Show one to your customers, take the orders and the profit. Write for details, and new Catalog 35.

The Barber Gas Burner Co.
 3702-4 Superior Avenue
 CLEVELAND OHIO



Made in $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ ", 1 ", $1\frac{1}{2}$ ", 2 sizes.



Oil Fired Complete 8-Stage Air-Conditioning Unit Including Cooling

Dailaire

Systems of Heating - Cooling and Air Conditioning

You need not pass up any house if you sell Dailaire systems of heating and air conditioning.

The line is complete, including our Chrome Series for oil or gas, and our O-200 Series for oil and our 100 and 200 Series for coal, either hand or stoker fired. Remember with Dailaire you can have all or any part of air conditioning from heating to cooling.

This, Mr. Dealer, offers you the opportunity of a life time, to tie to a line that has everything, plus individual design and attractive appearance, that places it in a class by itself.

Write for complete new catalog and agency plan.

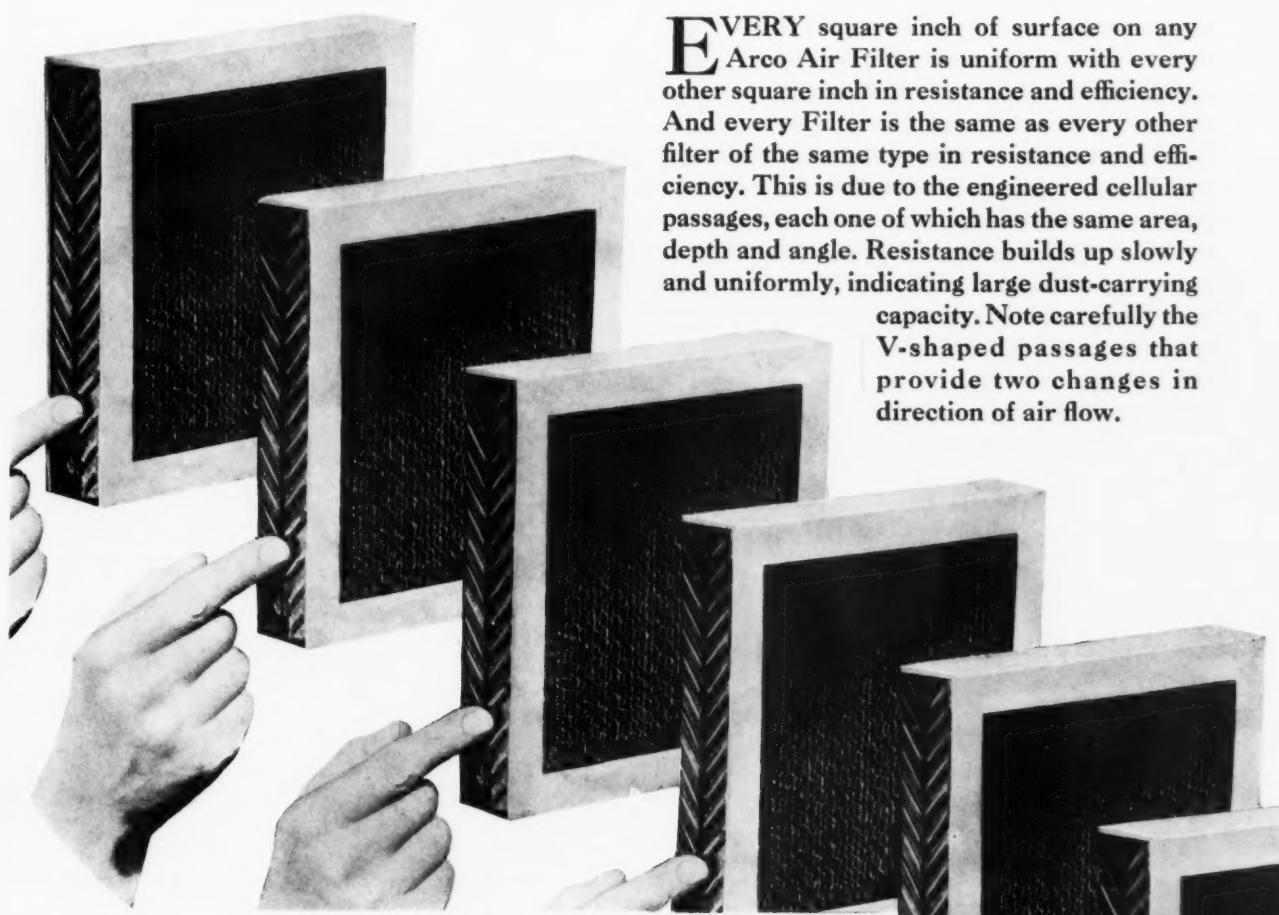
DAIL STEEL PRODUCTS COMPANY

1050 Main Street

Lansing, Michigan

ARCO *Air* FILTERS

have Uniform Resistance



EVERY square inch of surface on any Arco Air Filter is uniform with every other square inch in resistance and efficiency. And every Filter is the same as every other filter of the same type in resistance and efficiency. This is due to the engineered cellular passages, each one of which has the same area, depth and angle. Resistance builds up slowly and uniformly, indicating large dust-carrying capacity. Note carefully the V-shaped passages that provide two changes in direction of air flow.

DISTINCTIVE ADVANTAGES ARE

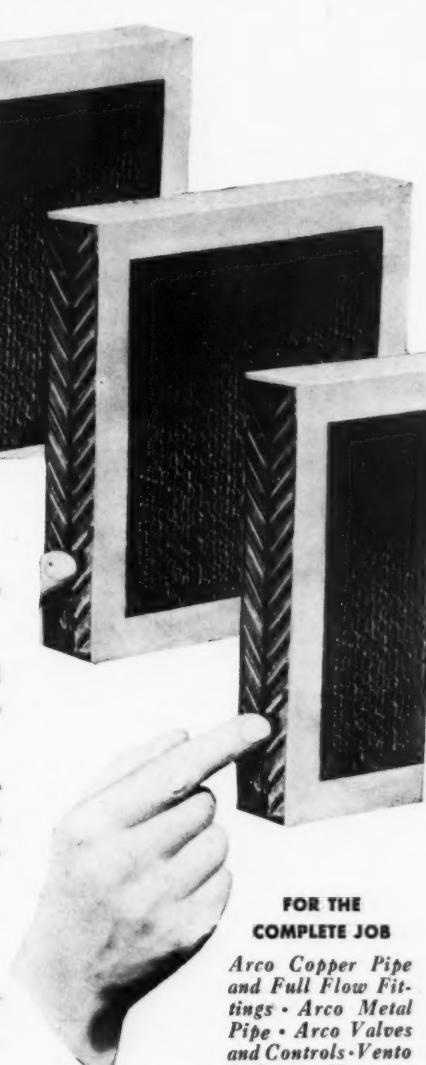
- Light — inexpensive — throw-away type.
- Odorless.
- Viscous coated — saturated — will not drip oil at 180°.
- No dry dust can pass through filter into air stream.
- Cellular type — providing 90° change in air flow.
- Resistance builds up slowly and uniformly, insuring large dust-carrying capacity.
- Made in special types for air-conditioning units, fan furnaces, commercial and ventilating installations.

INDUSTRIAL DIVISION

AMERICAN RADIATOR COMPANY

40 West 40th Street, New York, N. Y.

Division of AMERICAN RADIATOR & STANDARD SANITARY CORPORATION



FOR THE COMPLETE JOB

Arco Copper Pipe
and Full Flow Fit-
tings • Arco Metal
Pipe • Arco Valves
and Controls • Vento
Indirect Heaters.

THE New

SCOTT
NEWCOMB

All Year AIR CONDITIONER

Contra-Flow Principle — Large Heating Surfaces — Complete Combustion of Fuel Gives High Efficiency

The S-N LINE is Complete

S-N Oil Furnace
For steam, hot water or vapor heating systems. Optional burners for low-grade oils or gas. 90% efficiency! Three sizes—500, 1,000, 1,500 ft. E. D. R.

S-N "Pioneer" Pressure Type Burner
Engineering superiority, beauty of design and finish, exclusive mechanical features, quietness and super-efficiency. Three models, from 250 to 10,000 feet steam radiation.

New S-N Gas Burner
Can be furnished with all S-N heating units. This is a unit-constructed UP-SHOT BURNER—efficient, flexible. Combustion is complete and noiseless. Designed to work over a wide range of gas pressures.

New S-N "Junior" Burner
Low-pressure air atomizing type—burns the heavy oils. Nozzle orifice 110 times the area of pressure burner nozzles. Only one pump used for metering oil and lifting oil from sub-gravity tank. Magnetic cut-off valve. Integral safety. Blower giving violent swirl to air. Electric ignition. Large area filter. Quiet. Reliable.

**COMPACT
HANDSOME
QUIET
EFFICIENT
LOW PRICE**

No Metal-to-Metal Contact — Blowers Built on a Separate Frame Mounted on a Rubber Base and Joined to Unit by Canvas Bellows.

Oil or Gas Burner Optional. Can be Equipped with Special Cooling Coils Served by Refrigerating Unit.

THE new S-N Air Conditioner provides the opportunity for you to *lead your territory* in air conditioning sales and profits with a unit ahead of the field.

The S-N Air Conditioner can be sold to homes already equipped with warm air heating and to new homes being built with every facility for the finest automatic heating, cooling and air conditioning.

The Air Conditioner is only one reason the S-N line is the **BIG OPPORTUNITY LINE** for 1935. Here are more:

1. The higher efficiency and lower cost of all S-N units and burners makes it possible to replace present equipment

—and show the owner a real saving that will pay for the equipment in a short time.

2. S-N products are the result of the greatest experience in the automatic heating industry—that of the industry's pioneers, L. L. Scott and E. C. Newcomb.
3. Each S-N product is built in one of the most complete and efficiently operated plants in the country—making possible highest quality at a low price.
4. The S-N line is complete—and there's a unit to meet every automatic heating and air conditioning requirement.

The F. H. A. Plan makes it easy to interest home owners in air conditioning and the S-N Air Conditioner makes it easy to close the sale.

Write or wire today for details of the complete S-N line and franchise.



SCOTT - NEWCOMB INC.
1922-1 PINE STREET, ST. LOUIS, U. S. A.

...the Problem Corner

Joist Space Return

American Artisan:

In the December issue of American Artisan M. S. Tapley submitted a method for carrying return air through joist spaces and requested opinions of readers.

Using dimensions given and scaling the drawing for those lacking, we have substantially the following: Area through studs, .32 square feet; area at entrance to joist space, .4 square feet approximately; Greatest area in joist space, 1 square foot approximately; Area through plastered ceiling, .65 square feet approximately.

Assuming a return of 150 c.f.m. we have approximately the following velocities: 470, 380, 150, 230—all in the space of a few feet.

In view of these changes in velocity with the accompanying air disturbance, we cannot see that this method offers any new advantages over sheeting the joists.

F. H. Geer,
Standard Furnace & Supply Co.,
Omaha, Nebr.

Steel Windows

American Artisan:

With further reference to the problem of condensation of moisture on steel windows due to heat transmission through the metal bars, I have had no experience with storm windows, but have had considerable experience with the screens which are used with the Fenwrought windows. These screens fit closely in the steel frame.

If the winter windows fit as closely I believe the amount of leakage would be negligible.

I am inclined to think that more cold will be transmitted by conductivity through the metal frames of the winter windows from their contact with the steel frames of the windows which extend to the outside air.

A thin layer of felt ribbon between the winter window and the frame should stop the greater part of this conductivity.

H. A. Daniel,
Atlas Roofing Co., Newburgh, N. Y.

Garage Ventilation

American Artisan:

I have read with considerable interest in your "Problem Corner" your reply to E. W., New Mexico, on the ventilation of a garage.

A report was presented to the recent meeting of the American Society of

Heating and Ventilating Engineers at Buffalo of a Code which will probably be adopted by the Society in a letter ballot. I would suggest you ask the Secretary of the Society for a copy of this Code and the explanation which goes with it.

For the time being I simply wish to correct certain statements which you have made. You assume that the weight of gases enters into their movement within the room and that therefore gasoline fumes and carbon dioxide will drop to the floor and carbon monoxide will neither rise nor fall, but diffuse.

Gasoline fumes of course come from gasoline spilled on the floor. The source of it is therefore, at the floor and since there is nothing to make the fumes rise you are essentially correct in your analysis of the situation from the standpoint of gasoline fumes and movement on the floor is what is needed to break up the pocket of the explosive gases.

You are essentially incorrect in mentioning carbon dioxide at all because it does not enter into the problem in any way but if it did, it does not fall to the floor because of its greater basic gravity but diffuses throughout the space and that law of diffusion is only upset by temperature.

That same law upsets your theory that carbon monoxide will neither rise nor fall but will diffuse because the carbon monoxide is hot as it comes from the exhaust pipe of the cars and hence according to all tests available, it rises toward the ceiling and according to tests made by the Laboratory of the A.S.H. & V.E. the most effective place to remove it, the place where it can be moved with greater economy, is near the ceiling instead of near the floor.

If the garage is in the warmer parts of New Mexico the method you have suggested will do very well because the doors and windows will be open and all that is necessary is to create a motion through the building. If however, the garage is in the colder sections of New Mexico where heat is necessary, it is almost impossible to correctly answer their question without knowing something about the type of heating that is used. The committee studying the problem of garage ventilation early reached the conclusion that mere volume of air did not solve the problem.

E. K. Campbell,
E. K. Campbell Heating Co.,
Kansas City, Mo.

Duct Sizing

American Artisan:

We have been facing a problem of duct sizing in connection with the different velocities advised for air conditioning. Of course for heating or for cooling separately, the problem is not acute, but what velocity should pipes be sized for when the system will be used for both heating and cooling?

Where should the inlets and outlets be located so that the same ducts can be used the year round? Are there any patents which will be violated by use of a return or by-pass system in the duct work for a cooling system?

E. L. K., Illinois.

Reply by The Editors

The industry in general is using velocities in the mains of from 500 to 600 feet per minute. We, personally, are recommending velocities beginning at 800 and going up to 1,000 feet per minute.

This winter and last we tested a number of jobs where these 800 foot velocities were employed and found absolutely nothing wrong with them. These higher velocities make possible smaller pipe sizes; reduce heat loss from pipes (which is more serious than generally suspected); tend to keep the register air temperature at a uniform level throughout the lines (which is highly important) and, so far as we can find out, eliminate many problems of turbulence which arise with slow velocities in big pipes.

You raise the point—if we use 800 feet per minute for heating and want to increase our room air change by 200 to 300 per cent for summer cooling what sort of velocities do we get? The answer is—we do get quite high velocities in the mains, but we have stepped up the air changes 300 per cent in two of our test houses without bringing about any air noise due to velocity. If the fan is quiet and the motor is not over-loaded, there is little chance for air noise until we reach velocities above 2,000 feet per minute.

Regarding the location of inlets and outlets, you will find some interesting information on this subject in the March, 1935 issue of AMERICAN ARTISAN; written by S. Konzo.

Generally speaking, warm air diffuser type registers at the baseboard give the best results for winter heating. High sidewall registers above the heads

The Problem Corner . . .

of occupants, using high velocities to project the air stream to outside walls, give best results for summer cooling. The ideal combination would be two registers on one stack, as suggested by Mr. Konzo in the March article, with provision made to cut off the register not in use. As this is sometimes impossible to sell, we suggest that you stick to the baseboard register because good results during the long heating season are more essential than good results during the relatively short cooling season.

Regarding returns, this is a matter of personal opinion. A great many contractors are installing returns in every room except kitchen and baths; others install returns in all first floor rooms except the kitchen and use possibly one large return in the upstairs hall; still other contractors depend upon the stair well for return air and do not try to take air out of the second floor.

We can find rabid advocates for all three systems so you can take your choice.

I do not believe you will infringe on any patents applying to a by-pass system. We refer you to the articles in the June, July, August and September,

1934 issues of AMERICAN ARTISAN.

Joist Returns

American Artisan:

I can say only good things about Mr. Tapley's suggested method of helping return air back to the furnace or blower with the aid of smooth, galvanized iron. I do feel, however, that such a method belongs in an article, "What Price Duct Work."

One very important thing in returning air down an outside studding space is to make very sure that no outdoor air can get into the studding space, as the cold air will blow up into the room when the blower is off.

A. W. Hunt.
Kansas City, Mo.

Crackle Paint

American Artisan:

I would like to have you advise me if it is possible to purchase a small quantity of this crystalline finish that is being used on furnace casings, fan

housings, etc. Is this material a patented article and does it have to be baked on the sheets in the flat or can it be applied and allowed to dry ready for use?

G. F. M., Connecticut.

Reply by The Editors

There has been a considerable amount of trouble among contractors in attempting to apply the so-called crackle finish to furnace casings.

In most cases these crackle finishes were applied as a one-coat proposition and, due to the fact that the temperatures of the casing metal were usually uneven from top to bottom, dull spots appeared on the casing.

A well known manufacturer who has been using a crackle finish on their oil burning air conditioner and have done a considerable amount of experimenting with various types of crackle finish lacquer advises that after a lot of investigation they are now using products of a local enamel manufacturer. (Name supplied reader).

This company suggests that you apply (with a spray gun) a first ground coat of green enamel, follow this with one coat of the crackle enamel and finish off with a third coat of pure clear enamel.

New York Meeting

(Continued from page 22)

"Our merchandising plans can be as good—we can offer leaders, use attractive displays, give as good guarantees, provide as generous time payment plans, so all we need to fight is price. If better service, better quality, better responsibility won't beat price, then we need to change our merchandising methods."

Mail Order

H. A. Daniels, Newburgh, continuing the discussion of mail order competition declared that any time a manufacturer sold to mail order houses at 36 per cent lower than the dealer's price, that manufacturer was unfair. Either his price to the mail order house was too low, or his price to the dealer was too high. Mr. Daniels propounded the idea that we all need more cooperation. "Civilization, today, is built on cooperation," he said, "and if it were not we would each of us have to grow our food, weave our clothes, and

spend most of our time providing creature comforts. Association cooperation is one of the highest levels of cooperation. The trouble is those who need cooperation most are those who don't come to our meetings. This cooperation must be paid for—in time, thought, effort, money."

J. D. Wilder, American Artisan, Chicago, concluded the mail order discussion by showing a large chart containing fifteen questions asked the mail order houses and their answers. These questions brought out that: 1—All mail order stores quote the same price for the same furnace; 2—Store managers have instructions to be always competitive, this meaning usually lowest in price; 3—All stores "farm out" their installations and no store has an installation crew or shop; 4—Contractors who do the installing usually are paid on a per job basis; 5—Overhead on furnace sales is usually lumped into a general overhead for a plumbing and heating department or carried alone; 6—Mail order sales

are mostly in the smaller sized homes and furnace sizes, but they will take bigger work; 7—Store managers are given permission to cooperate with local associations in maintaining a profitable level of prices, but are also instructed not to cooperate with code authorities or to pay assessments; 8—That an underlying mail order principle is to be lowest in price, but all stores want to keep good will of our industry and the public.

The speaker pointed out that irresponsible conversation on mail order prices was of little value and showed a mail order quotation with contractor's cost prices alongside the items. The tabulation showed the mail order selling price on the furnace to be \$77.50 and the dealer's cost \$88.00. The mail order selling price on fittings as \$67.00 with the dealer's cost \$58.12.

The weaknesses of the mail order program were pointed out as—mediocre to poor installations, with no control over the ability

(Continued on page 54)

ASSOCIATION Activities

Rockford, Ill.

Our Association meets every two weeks. At our last meeting we had Mr. Griswold of the FHA for our principal speaker.

Our most interesting activity now is an ordinance which we presented to the City Council of Rockford some three months ago in regard to sheet metal and furnace installations, which I think will be passed on very soon. We have had a great deal of discussion and ups and downs on this matter, as the real estate men do not seem to be in favor of this ordinance. A man must pay a city fee of \$25.00 each year to do sheet metal and furnace work, or installing any blower, furnace, etc. For violating this ordinance the fine will be \$10.00, and not to exceed \$50.00.

We have at this time about twenty-five shops that belong to the Association, that are active.

We hope to continue forced air meeting, held by the America Heating & Supply Co. of Rockford. Some two hundred sheet metal men from the northern part of Illinois attended the last meeting. This is the first school that has been held in Rockford of this kind. We expect to have this school once a month.

Alga Reece,
Secretary.

Salt Lake City

In January, new officers were elected as follows:

J. S. Ashton, President, 1172 East 21st South St.

R. A. Pons, Vice President, 271 Edison St.

M. L. Groo, Secretary, 144 West South Temple St.

M. L. Groo,
Secretary.

Indiana

The Governor signed the State N.R.A. Bill for Indiana on Saturday, March 9th, with an emergency clause putting it into immediate effect. It remains in effect until March 31st, 1937. This makes an easy matter of Code enforcement, including collection of assessments.

The Indiana Board of Code Administration has been marking time, waiting until the situation became clear. This State Law clarifies the situation, and the State Board will go ahead immediately. The ninety per-cent of the trade in Indiana who want to see conditions bettered, will welcome this law, which makes Code compliance uni-

versal. It should be understood that the Code Administration Board of Indiana is an educational institution, interested solely in elevating the trade, and in eliminating unethical trade practices. It is not the intention of the Board to club tinnery right and left, although of course penalties will have to be inflicted on the insistent chiseler.

The State Board is an organizing body, and also a court of appeals. The State Board will set up the machinery in each locality, for the adjustment of complaints. It is hoped and anticipated that practically all complaints will be adjusted locally, by the local boards, selected by the members of the division within that locality. It is the desire of the State Board, that all complaints be adjusted locally. However, if any party to the complaint is dissatisfied with the decision of the local board, he can appeal to the District Board, and on up to the State Board, or he can appeal direct to the State Board immediately.

The State By-Laws provide for a complete organization in each county, and a complete organization in each District, in addition to the State organization. Counties containing too few contractors to organize effectively, will simply use the District set-up.

The County set-up for local settling of complaints is ideal, where it works out. It must be remembered however that certain contractors will not be satisfied with decisions of committees made up of their competitors. Therefore they are given the right to appeal to the District or State Board. Also the State Board will have disinterested and unattached field men, to make investigations, and to report on the facts to the committees and boards before whom the complaints are filed.

Inasmuch as the work of the Board will be largely educational, the field men will be the most important part of Code administration. They will be "all time men," doing nothing excepting work on Code affairs all day long, and will be informed as well as unprejudiced. It is through the educational efforts of the field men, coupled with the voluntary compliance with the Code, on the part of the contractors, once they understand the meaning and value of the Code, that the greatest value will come.

Paul R. Jordan,
Secretary.

Indianapolis, Ind.

The Indianapolis Association's Educational and Entertainment committees

have started a series of meetings of Business Administration, which we hope will be of benefit to the Industry.

Since the State N.R.A. enabling act was signed by the Governor March 9, there is no doubt that plenty of activity along code enforcement will start.

There has been a Central Bid Depository, for the Construction Industry, established here, which will be used by this Industry.

The following is a list of Officers and Board of Directors for the Association for the year of 1935:

President, E. L. Carr, 2921 East 10th Street.

Vice President, J. E. Mattingly, 430 South Meridian Street.

Secretary, Elmer R. Mullin, 5517 Bonna Avenue.

Treasurer, H. D. Clark, 119 North Alabama.

BOARD OF DIRECTORS

Sheet Metal Division:

Herchel Larsh, Chairman
M. L. Tompson
W. S. Waters

Warm Air Heating Division:

Homer Selch, Chairman
T. M. Rybolt,
Fred Boone

Roofing Division:

J. C. Rector, Chairman
J. W. Collins
Vernon Reeder

The Fur-Ti-Nac Club have decided to have a drawing for a prize at each meeting during April and May. The drawing will be limited to contractors. The prizes will be furnished by the jobbers and manufacturers.

The attendance committee composed of Wm. Meador, Frank Doyle, Herman Schmidt, W. S. Waters, and Frank Sink, intend to make a special effort to get contractors to attend the luncheons in their work clothes. The meetings will be strictly stag.

Elmer R. Mullin,
Secretary.

Du Page County, Ill.

An amendment has been submitted to our Senate sponsor which supports the proposition of local permits and inspections and obviates the possibility of **duplicate licensing** by municipalities. All sponsors have been in accord with the proposition that local permits and inspections are complementary and supporting to State licensing. The amendment will not repeal any present local permit and inspection ordinances, but declares such ordinances a policy

Association Activities

of the State of Illinois. The portion of the amendment relating to the prevention of duplicate licensing by municipalities, has been submitted to take care of the Chicago situation. That is the only city in the state, to our knowledge, which has local licensing (not permits or inspections).

This new amendment is known as "amendment to Section No. 11 of Senate Bill No. 114."

SENATE BILL No. 114 Amendment to Section No. 11. (In addition.)

The right of any Warm Air Heating Contractor to pursue his business or occupation shall not be impaired or affected by qualifications or conditions in any ordinance, law, rule, regulation or order adopted, heretofore or hereafter, by any County Municipality, City, Village or any other sub-division of Government, provided; nothing in this section shall prohibit Municipalities, Cities, Villages or any other sub-division of Government from providing for a Warm Air Heating Inspector or from requiring permits for the installation of warm air heating systems and specifying a fee of not more than Five Dollars therefor.

It is hereby declared to be the policy of the State of Illinois that Municipalities, Cities, Villages and other sub-divisions of Government should after the enactment of this Act, with the advice of the Department of Insurance, provide by ordinance, law, rule, regulation or order for the inspection of warm air heating systems, and to provide for and appoint a competent Warm Air Heating Inspector or more as required. Such appointees shall be Warm Air Heating Contractors who have been engaged in the business of warm air heating contracting for a period not less than five years.

We are pleased to report that the Bill was reported out of the committee upon a motion by Senator Richard J. Barr, our Senate sponsor, "that the Bill be adopted with recommendation to pass". This places the matter on the Senate floor and is subject to three readings before vote. The Bill is now in one of its critical stages.

In order to acquaint the industry with the sponsorship of this legislation, we are listing the associations and persons who have either spoken or written their endorsement up to the present. The movement is opposed by one association (East Side Sheet Metal Contractors Assn., East St. Louis) and two individuals. A few associations have not placed themselves on record. We are unable to learn if they are functioning, but find no mail has been returned unclaimed in these instances.

Cleveland, Ohio

At the annual meeting of the Sheet Metal Employers Association of Cleveland held in February, the following officers were elected:

W. H. Weenink, President.

H. H. Pennell, Vice-President.
C. N. Young, Secretary.
P. E. Miller, Treasurer.
—Chas. F. Schirmer,
Executive Secretary.

Tulsa, Okla.

The Tulsa Sheet Metal Contractors Ass'n met in regular session on Monday night, March 4, at which time the following officers were re-elected to serve for a six-months' term from that date.

E. C. Upton, President.
G. E. Looney, Vice-President.
W. A. Conkling, Secy.-Treasurer.
D. A. Harper, Sergeant-at-Arms.

Mr. Upton was elected to fill the vacancy of Carl Dean, who resigned on Dec. 1st to take the position of resident engineer with the Oklahoma Natural Gas Co. of Tulsa.

Regular meetings were ordered held the first and third Monday nights of each month. It is the general opinion of our association that the code is not satisfactory to our line of business in that it seems to be impossible to enforce its provisions. Reports of our members show an improvement in business over the same period of a year ago.

W. A. Conkling,
Secretary.

Salt Lake City

In January the following new officers were elected:

J. L. Ashton, President.
Ray Pons, Vice-President.
M. L. Groo, Secretary-Treasurer.

About eighty per cent of the sheet metal shops in Salt Lake are active members in our association. We meet every Monday night in the Chamber of Commerce building and meetings are very well attended. Since we have organized there is a much better feeling among the members of the Sheet Metal Industry in Salt Lake. We all help one another.

At present we are trying to establish uniform retail prices for our work, so that we may all make a fair profit out of our business, instead of taking jobs at below cost.

We have entertainment every so often, and every once in a while we invite an entertaining speaker to give us a talk pertaining to our work.

Lately we have been getting good results with code compliance. It has helped considerably on several occasions. I think our members are for the code, and trying to live up to it, as near as possible.

The principal benefits the code has brought in our area, are first, it is stopping the members from figuring below cost; second: There is a standard wage scale; third: thirty-five hours a week has given many more men employment.

M. L. GROO,
Secretary.

National Warm Air Heating and Air Conditioning Assn.

The National Warm Air Heating and Air Conditioning Association will hold its mid-year meeting in the Deshler-Wallick Hotel, Columbus, Ohio, on June 4-5-6. The first day will be devoted to committee and group meetings. The convention sessions will occupy all of Wednesday and Thursday mornings. A Golf Tournament at the Columbus Country Club is being arranged for Thursday afternoon.

The program will include the following—Fundamentals in Air Conditioning, A B C's of the Standard Code, Trouble Jobs, the Responsibility of the Manufacturer, Jobber and Dealer Therewith, The Industry's Installation Codes, The N.R.A. Codes of our Industry, The Work of the Technical Educational Committee, This Warm Air Furnace Business, Engineering—Benefit or Bunk, The Control of Fans and Blowers in Warm Air Heating Plants.

The Research session will be held Thursday morning.

Springfield, O.

A meeting was held March 25th, with all members present but one. The meeting of the National Association at Cincinnati was discussed and our members were informed by the Treasurer that our State and National dues for 1934 were paid. The "Code" was discussed to a great extent by all present. Trade is very quiet and we have hoped that something will happen to open things up in a business way. Our local association is thirty-two years old and we still have some of our original members, can any other local equal this record? Our new year starts with the month of May and during that month we will elect officers for the new year.

Chas. F. Hauck,
Secretary.

St. Louis, Mo.

The St. Louis Association held a combination business and social meeting March 25th. The meeting was held in the office of the City Ice & Fuel Company, where an air conditioning system, using ice as a cooling medium, was seen in operation. Lunch and refreshments were served and a pleasant evening was enjoyed.

W. Cavallo,
Secretary.

Sandusky, O.

At our March meeting, our group was addressed by George Oswald, Auditor of Erie County on the Ohio Sales Tax and its application to the Contracting Industry. It was voted to have Tax Exemption blanks printed by the Association and to distribute them among the members for use. Franklin D. Hohler acted as host to the group and a fine lunch was served after the meeting.

C. M. Gundlach,
Secretary.

An American Artisan Survey

Code Authority Committee Reports

Month by month various code authorities are getting their areas and organizations perfected. The progress made has not always been just as anticipated. This month's section reports some new developments of particular interest. Your reports are invited.

Zone 2

1. Effective date 8:00 A. M., Monday, January 28, 1935.
2. **Territory Covered:** New York State Zone No. 2, Districts A, B, C, D, E, F.
3. **Location of Bid Depository:** Temporary Bid Depository, care of District Chairman until further advised.
4. **Officer in Charge:** District Chairman until further advised.

5. Minimum Requirements: Signed duplicate estimates or competitive bids, to be filed for all work (new or old), of an estimated selling price or bid price of \$100.00 or more. Where an estimate or bid is made up of several individual items, the total, or if alternate amounts are listed, the largest amount shall be used.

6. Fee: The fee for filing of bids shall be as follows:

\$.25 on bids or estimates \$100-\$249.99
 .50 on bids or estimates 250- 499.99
 .75 on bids or estimates 500- 749.99
 1.00 on bids or estimates 750 and over

7. Bid Envelopes: Envelopes especially prepared for the filing of bids are available at the bid depository and a supply should be obtained by all contractors.

8. Filing of Bids or Estimates: Signed duplicate copies of all competitive bids or estimates on all projects located within the confines of this area (Zone 2, New York State), must be deposited with the Bid Depository in the district in which the work is to be done.

9. Definitions: a. **Definition of Competitive Bidding:** The term "Competitive Bidding" means "the submission at, or before a predetermined time, of all comparable propositions, by invited persons, to an awarding authority, to execute a specific program of work, furnish a definite service or supply the materials specifically required for a particular project at a stipulated price."

b. Definition of Awarding Authority: The term, "Awarding Authority" as used herein means, "any individual,

group or agent, who upon receipt of competitive bids, awards contracts."

10. Forms of Bids or Estimates
Bids or estimates shall state clearly the definite contract or selling price (either total, lump sum or definite unit price), shall be on definite projects, definitely identified; approximate bids or bids on projects not properly identified shall not be considered legal bids.

All bids shall contain the following clauses:

a. "This proposal is based on the Owner's compliance with Chapter VII, Article IV, Section 16, Subsection (d) of the Construction Code."

b. "This proposal is submitted for acceptance within 30 days and is automatically withdrawn if not accepted within that time."

11. Bids to Contractors: Method of competitive bidding practices, as outlined in Chapter I, Article VII, Section 7, requires "Awarding Authority shall designate a specific hour and place for receiving competitive bids. All bids submitted by subcontractors shall be delivered to the contractor at least 24 hours prior to the time for the receipt of the bid of said contractor by the Awarding Authority. Bids received after such time, or from uninvited bidders, shall be returned unopened. All bids shall be required to be signed by a duly authorized repre-

sentative of the bidder and enclosed in a sealed envelope on the outside of which shall appear its identification as a bid for the particular job."

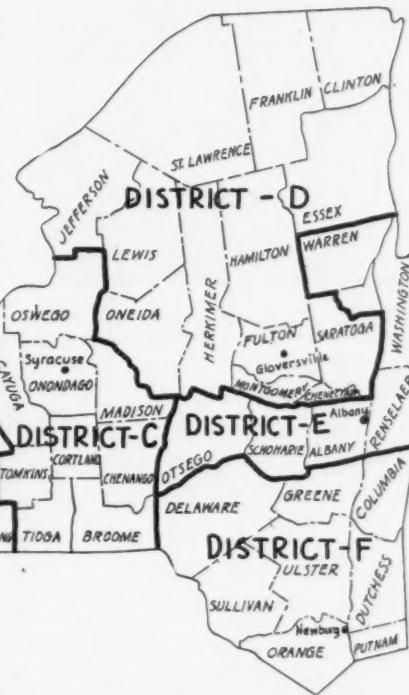
12. Closing Time of the Bids: a. The Awarding Authority (Owner, Architect or Owner's Agent), indicate definitely a specific hour and place for receiving competitive bids from general contractors, and/or subcontractors. The general contractor must receive bids from the subcontractors delivered to him at least 24 hours prior to the time set for the receipt of the bids from said general contractor to the Awarding Authority.

All members of this industry, who are asked to submit bids as subcontractors to general contractors, must file a copy of such bid with Bid Depository at least 24 hours previous to the hour designated for the receipt of bids by the Awarding Authority from the general contractor.

b. When the Awarding Authority (Owner, Architect, or Owner's Agent) takes competitive bids from members of this industry direct, having designated a specific hour and place for the receipt of such bids, copies of same shall be filed with the Bid Depository in advance of the hour designated for the opening of such bids.

c. We quote Interpretation No. 3 of the Construction Code Authority:

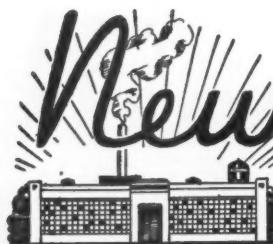
"The intention is to fix a definite time prior to the delivery of the general contractor's bid to the Awarding Authority beyond which subcontract bids may not be submitted, and the general contractor thus has a reasonable period in which to analyze such sub bids and to assemble his general bid. If this period terminates on Sunday or a holiday, the general contractor's office would not have the minimum 24 hours period necessary, since business is customarily not conducted



on Sunday or a holiday. Therefore, in figuring the period (24 hours is the minimum), Sundays and legal holidays shall be excluded."

13. Delivery to the Bid Depository
Bids may be delivered to the Bid Depository in person or mailed. When mailed must be postmarked not later than 24 hours before the original bids are to be received by the Awarding Authority, in the case of subcontract bidding, or postmarked prior to such time of receiving bids by the Awarding Authority, the bids will be considered as having arrived on time at the Bid Depository. In the case of a direct bid

(Continued on page 55)



New PRODUCTS

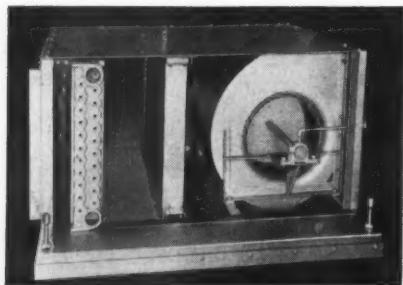
For your convenience a number has been assigned each item on this page. A coupon will be found on page 59. Check the items you are interested in and mail the coupon to us. Complete information will be forwarded.

116—Conditioner

The Trane Company, La Crosse, Wisconsin, has completed new literature and marketing plans for the Climate Changer, the package air conditioner in the Trane Line.

Improvements have been added such as the new dress and appearance. The shell has been modernized and made more compact to fit the modern mode for architect and home owner who have buildings where space is at a premium.

The Trane Climate Changer is of the draw-through type designed to heat and humidify in winter and cool and

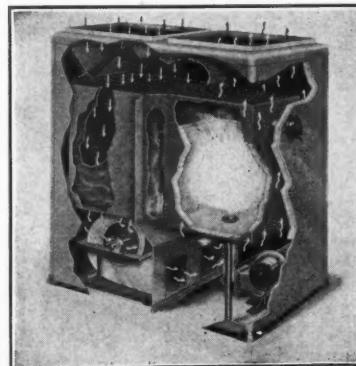


dehumidify in summer. The unit may be employed with any steam or hot water heating boiler and is simple and easy to install, easy to operate and has positive control. Summer cooling may be secured through the use of cold well or city water or with direct expansion refrigerants.

117—Air Conditioner

A new air conditioner announced by Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo., has a burner entirely enclosed and located just under the combustion chamber of the furnace proper. Either the S-N vertical flame oil burner is used or the S-N bunsen type of gas burner. Access to the burner or to the air blowers is through panels which are quickly removable. The products of combustion flow upward and pass over the rear wall of the combustion chamber and downward and out into the bottom of the six economizer sections, then to the top and back to the chimney.

Air filters (removable from either side through removable panels) are located just above the economizer sections. The blowers and motor are mounted on a frame which has no mechanical connection to the furnace. Air for the burner is taken through a separate pipe which connects to the outside of the casing so that no air from



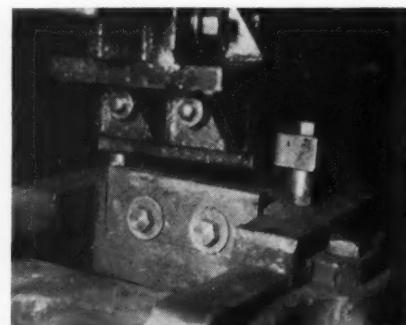
the air blowers proper is furnished to the burner.

The water spray for humidification is located just under the lower part of the combustion chamber. Cooling coils for summer cooling are provided when needed in the intake compartment. The interior of the case is lined with air cell insulation.

118—Welding Electrode

A new arc welding electrode, placed on the market by The Lincoln Electric Company, Cleveland, Ohio, is designed for restoring cutting edges on tool steel and for manufacture of tools from ordinary steel.

This new electrode, known as "Tool-weld," is the product of several years



of research and is of particular value to all industries working with metal or wood. By using this tool steel arc welding electrode, lathe tools, bits, reamers, milling cutters, drills, cutting and forming dies and other tools which have become worn in service, can be given a new and harder cutting edge than has heretofore been possible.

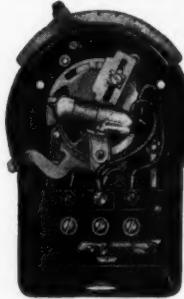
119—Stokerswitch

The Stokerswitch is a logical and practical control for keeping stoker fires alive in mild weather when calls

for heat from the thermostat are very infrequent. During long "off" periods of the thermostat most domestic and small industrial stoker fires will gradually subside to a point where fresh coal fed in will not be ignited unless the fire is kept up by occasional brief firing periods. The Stokerswitch is stack mounted and designed to give a short operating period whenever the stack temperature drops to a predetermined point. The condition of the fire is directly indicated by the stack temperature, therefore this arrangement logically provides for operating the stoker only when and as long as the condition of the fire requires—and with a minimum increase in temperature of the heating system.

A high temperature cutoff feature is built into the new controls which automatically breaks the circuit to the stoker motor when the element temperature reaches 850°, thus eliminating the possibility of installing the Stokerswitch under conditions that would later permit excessive temperatures.

The high temperature cutoff feature promotes efficiency by shutting down



the stoker for brief periods when the stack temperatures are high.

The Stokerswitch consists of a stamped steel case which houses the Con-Tac-Tor Mercury Switches, operating cams and terminals. A shaft carrying the bimetallic helix projects from this, the entire shaft and helix being enclosed in a protecting tube of seamless steel. This tube protects the sensitive helix from the corrosive action of flue gases. A mounting flange and sheet metal screws are furnished for the easy mounting of the control.

120—Portable Drill

A new $\frac{1}{2}$ inch standard duty portable electric drill is announced by Signal Electric Mfg. Co., Menominee, Michigan.

Specifications of this drill are as follows: Motor—Signal Universal for direct or alternating current 110-120 volts; housing—durable aluminum alloy; net weight 14 pounds; Bearings—Armature and spindle thrust high grade ball; Speed no load—420 R.P.M.

It's The Truth!

HANDY PIPE

**Is Built to Outlast
the Buildings It
Goes Into!**

It has construction features that make its name symbolic of its use. Sections are designed to meet every furnace installation requirement and they are so accurately made that they snap together to a properly tight fit. And they **STAY** that way!

Always a **QUALITY** product, its use pays you a profit through the speed with which your work proceeds, reducing labor costs on jobs.



And whether you use "regular" sections on "regular" jobs, or "special" sections on the most elaborate and intricate "Forced Conditioned Air" installations, you will find our merchandise and our **FREE** engineering service of greatest advantage.

F. MEYER & BRO. CO.

PEORIA

ILLINOIS

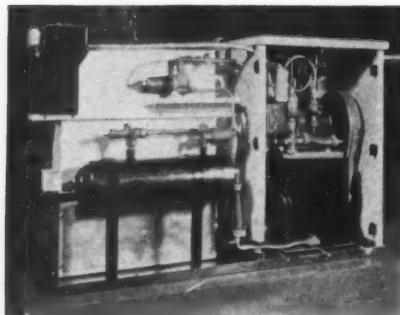
(If you haven't our Catalogue No. 49 and the Forced Air Duct Work Supplement, ask for either one or both)

New Products . . .

121—Conditioner

A self contained air conditioning unit with a capacity of $\frac{1}{2}$ a ton of refrigeration has been developed for Airtemp, Inc., by the engineers of Chrysler Motors. This unit, low in height, fits below the windowsill of the average home or office. The air is taken in through the front of the unit and is blown out through a grille located in the center of the cabinet top.

One of the features of this self contained conditioner is the fact that it is



of the "semi-movable" type. Thus the owner is able to move it from place to place if a change of residence is desired. The motor and compressor are mounted on a separate frame from the one which supports the coils, and the entire unit is mounted on a cork base.

Quantities of rubber, springs and sound absorption material are used to insure quietness.

Water taps and drains may be utilized for water circulation, and house current can supply power.

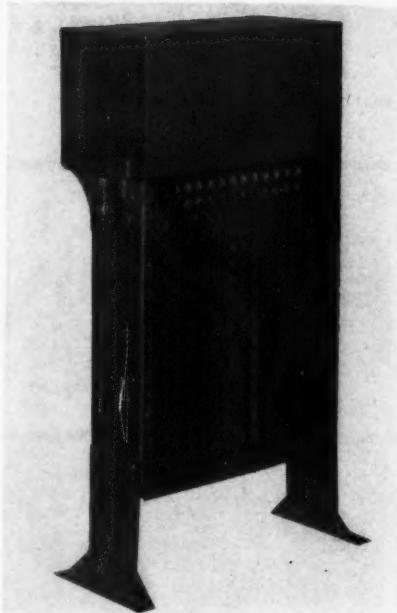
Cabinets 46½ inches long, 15½ inches wide, and 26 inches high contain motor, compressor, cooling coils and fan. These come in a number of standard finished or may be specially finished at slight extra cost.

122—Small Oil Burner

The Micro Corporation, manufacturer of Bettendorf Automatic Oil Burners, announces the Model G, a new small burner of high pressure type. This burner is equipped with standard type $\frac{1}{8}$ h.p. split phase motor, has a capacity of 1.35 to 2.5 gals. of No. 3 oil per hour.

123—Register Humidifier

A new register type humidifier, which can be placed in front of any wall register and is portable, containing no mechanical moving parts and automatic in operation in that it adjusts itself to changes in temperature, is announced by Louis D. Peik, 272 Washington Street, N. W., Warren, Ohio. A one-gallon water tank at the top of the unit feeds water to evaporators through which warm air passes from the register. Adjustable legs are provided to accommodate



variable positions of the warm air register. The water tank is detachable for filling and when in use is placed over a small cup of water seal in the top of the humidifier. The water will not flow from the tank until the small cup is nearly empty. A sleeve fabric serves as a wick and carries the water over the top and around the bottom where the water is in contact with the vertical evaporators. These evaporators are of fabric and designed to hold water in suspension for a considerable period.

New York Convention

(Continued from page 48)

of the mechanics, no insurance for the home owner; few owners take pride in their mail order purchases; the mail order houses are now operating under the most favorable circumstances and as business and buying power pick up people will want better merchandise.

"There are numerous things we can do to combat this competition—some things we can do individually; others we must do collectively. As individuals we can advertise leaders, we can have good displays, we can use adjectives as they do in describing our wares, we can be 'heating engineers' just as the mail order house man claims. Collectively we can work for licensing agreements whereby the ignorant tinner who takes mail order work at ridiculous prices can be licensed out of business. We can see that our local city and state codes provide for inspection of all jobs and

that our work be covered by job to be installed safely. We can work out cooperative buying and regulations which compel each advertising programs whereby our group puts its name before the public and guarantees the work each member does. We can see that every contractor carries ample insurance, that he is educated to understand the underlying principles of our business. These are not overnight cures; they are long term, but positive remedies."

FHA and HOLC

Floyd A. Vosteen, of FHA explained Title 1 and 2 of the act as published several times in this magazine. He reported that up to date FHA has made some 50 millions of loans with only six defaults, three of which are paying out in some manner. The stumbling block in New York state has been the banks, he declared. The banks have been overly cautious and in some cases downright antagonistic. FHA has worked out a district representa-

tive plan wherein one man has been assigned each of three districts to personally take all contractor loan applications to banks and see that the loan is put through. Our industry, the speaker reported, has shown up unusually well in the number of applications turned in and the volume of sales closed.

D. D. Hamilton, speaking on "Built Up Roofing" stated that surveys show loft and commercial buildings as first in the list of types of structures needing repair work. The next classification is apartment houses followed by residences.

As stated, the intervals for discussion brought out numerous spirited arguments over insurance, codes, assessments, compliance, enforcement, heating problems, roofing materials and applications, as well as general business. These discussions proved among the most interesting sessions of the convention and we are sorry that we cannot report them in detail.

Code Authority Reports

by members of this division to such Awarding Authority, the bids will be considered as having arrived on time at the Bid Depository.

14. Bid to Depository: Any or all bidders on any job shall file signed copies of their bids with the Bid Depository. Each bidder who filed identical bids with several general contractors may file one copy of his bid with the Bid Depository, but must list on the copy, the names and addresses of all general contractors to whom a bid has been submitted.

15. Method of Submitting Bids to the Depository: As explained in paragraph 8 the Bid Depository will furnish special Bid Depository Envelopes in which a duplicate copy of the bid for each separate project must be enclosed. On the outside of the envelope shall be marked the following information:

1. The name and address of the firm submitting the bid.
2. The specific date and time of bid opening by Awarding Authority. On the copy of the bid itself must be listed the names of the contractors to whom an identical copy of the bid has been submitted, in case of subcontract bidding.

16. Receipt of Bids: Upon receipt of bids at the Bid Depository, they will be "time stamped," the envelope

registered and held frozen or unopened until after the time specified for opening of bids by the Awarding Authority.

17. Opening of Bids: The Bid Depository will not open envelopes containing the duplicates of all bids on each project until the day following the closing time for receiving the bids. Any bidder may be present when bid envelopes are opened.

18. Listing of Bids: The Bid Depository will list all bids received on each project. These lists will be available only to those who have bid on the certain project and the listing can only be seen in the office of the Bid Depository.

19. Contracts Awarded: When a contract is awarded by the Awarding Authority, the successful bidder shall furnish the Bid Depository with a copy of the contract or acceptance or other evidence received by him, stating the amount, terms, conditions, etc. These papers shall be checked with the bids.

20. Checking of Bids: Bidding practices as enumerated in the Construction Code shall be checked by the Depository in every detail for the purpose of effectuating the ends of fair competition and the enforcement provisions of the Code.

21. Bids Arriving Late: Bids arriving at the Bid Depository after the specified time designated for depositing

of the same, will be returned to the contractor unopened, and cannot be considered for that project.

22. One Bid for Project: Where only one bid has been filed for a project the Bid Depository shall hold this bid unopened in its files as an indication at any future date that the bid from the only bidder was filed in accordance with the requirements.

23. Awarding Authority Compliance: A Code Requirement is that contractors shall not submit a competitive bid to an owner or any other person, corresponding to an Awarding Authority, unless such owner or other person agrees to comply with the Regulations recited herein governing an Awarding Authority.

24. Violations: Failure to comply with the provisions covering Bidding Practices and the Rules and Regulations as set forth herein, constitutes violation of the Code. Members are urged to thoroughly acquaint themselves with these Rules and Regulations of procedure so that they may avoid penalties through oversight or lack of understanding. Copies of bids not filed in accordance with these directions are not lawful and the bidder cannot accept any contract entered into in violation of these rules.

NOTE: Anyone knowing of a contractor bidding for work who has not deposited a copy of his bid with the Bid Depository, or learning of any Code violations, should communicate the fact immediately to your local Code Authority.

DAIRY TIN

IMPORTED "COOKLEY K" PRIMES

These large tinned sheets are well known for their unusual high quality and uniformity of coating. We have been importing "Cookley K" Tinned Sheets from England for many years and they have given universal satisfaction.

— IN STOCK —

IMPORTED "COOKLEY K" PRIMES

D4X (22 gauge)	36x84	28½ lbs. per sheet
D4X (22 gauge)	36x96	32½ lbs. per sheet
D4X (22 gauge)	48x96	43 lbs. per sheet
18 gauge	36x96	50 lbs. per sheet

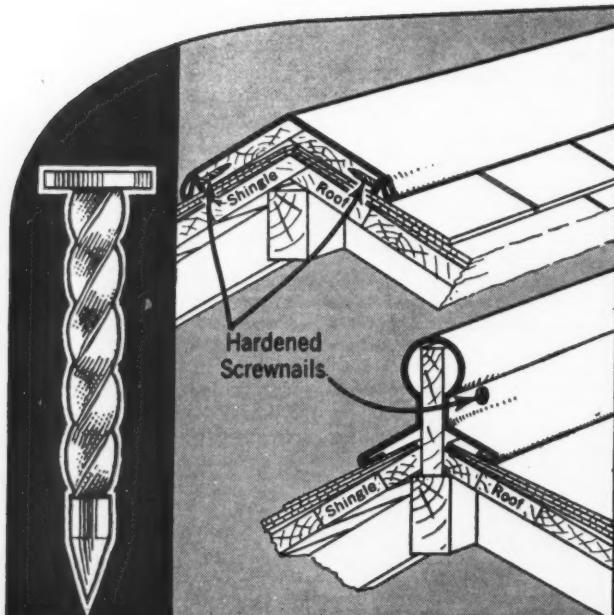
OSBORN'S DOMESTIC DAIRY TIN

4X (Heavy 25 gauge)	30x72	14½ lbs. per sheet
4X (Heavy 25 gauge)	36x72	17 lbs. per sheet
D4X (22 gauge)	36x96	32½ lbs. per sheet

Domestic Grade Subject to Prior Sale.
Weights shown are approximate only.

A DEPENDABLE SOURCE OF SUPPLY

THE J. M. & L. A.
OSBORN CO
 —DISTRIBUTORS—
 DETROIT-CLEVELAND-BUFFALO



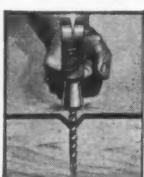
HARDENED SCREWNAILS

HOLDS like a Screw — Saves Time, Trouble

— in fastening Sheet Metal to Wood

With Hardened Screw nails it is easy to fasten sheet metal to wood securely. While they hold like screws, these unique Nails are much simpler and cheaper to use.

Just hammer them in. The hardened needle point does the job of a prick punch . . . making it possible to drive Screw nails right through metal that would bend or break ordinary nails. Once in, Screw nails STAY in. The hardened spiral threads cut into the metal and worm into the wood just like a screw. These Nails will not back out or loosen, even under severe vibration and contraction.



We want you to try Screw nails. See how securely they fasten cornices, metal ceilings, corrugated siding, gutters and other sheet metal work to wood. Send the coupon for FREE SAMPLES.

PRODUCT OF
PARKER-KALON
CORPORATION

Parker-Kalon Corp., 190 Varick St., New York, N. Y.

Send me free samples of Hardened Screw nails.

Name.....

Address.....

SOLD ONLY BY RECOGNIZED DISTRIBUTORS

News Items

Civil Service Examination

The United States Civil Service Commission has announced an open competitive examination as follows:

SHEET METAL FOREMAN

Applications for the position of Foreman and Layout Man, Sheet Metal Shop, Northeastern Penitentiary, Lewisburg, Pa., must be on file with the U. S. Civil Service Commission at Washington, D. C., not later than April 29, 1935.

The entrance salary is \$2,300 a year, subject to a deduction of 3½ per cent toward a retirement annuity.

Applicants must have had at least 3 years of experience as foreman and shop layout man of a factory manufacturing sheet metal equipment, or of a department in a large factory engaged in such manufacture, including generally the classes of work specified in the duties given in the examination announcement; in addition, they must have had at least 2 years of experience in designing and drafting for the manufacture of sheet metal equipment or furniture; provided, that 5 years of employment in which supervisory, layout, and drafting experience have run concurrently will be accepted as meeting the full requirements for eligibility.

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or customhouse in any city which has a post office of the first or the second class, or from the United States Civil Service Commission, Washington, D. C.

R. F. C. Policy on Industrial Loans

Industrial concerns, eligible to borrow funds from the Reconstruction Finance Corporation for the purpose of maintaining and increasing employment, have not yet taken full advantage of the assistance which the Corporation is prepared to extend.

Congress provided that such loans might be made to industrial and commercial businesses subject to the following requirements:

- (1) That the business must have been established prior to January 1, 1934.
- (2) That such loans be adequately secured.
- (3) That maturity of loan must not exceed five years.
- (4) That borrower must be solvent at the time of disbursement of the loan.
- (5) That credit at prevailing bank rates for loans of the character applied for not be available at banks.
- (6) That reasonable assurance of increased or continued employment of labor be given.
- (7) That the aggregate of such loans to any one borrower made directly or indirectly shall not exceed \$500,000.
- (8) That such other provisions as the Reconstruction Finance Corporation may impose be complied with.

The Directors of the Reconstruction Finance Corporation feel that these loans should be made in such a way that the available funds can be utilized as fully as possible for the advance of permanent business recovery. This objective can be accomplished best if the moneys loaned by the Corporation are used principally to supply funds for the payment of labor and the purchase of materials incident to the normal operation of the business, rather than for the payment of existing indebtedness, though in exceptional cases a small part of the loan may be used for payment of existing debts or for the financing of construction, improvements and/or repairs that do not materially increase capacity. When a loan is to be used primarily for labor and materials, a small portion of the loan may be applied to these latter purposes when necessary to assure ordinary and efficient operation.

The Corporation will make loans in cooperation with banks, or by the purchase of participations in loans made by banks.

Accordingly, we suggest to industrial concerns, to which credit at prevailing bank rates for loans of such character is not available but which can offer adequate security (even though such security may be frozen and therefore not generally acceptable to banks) and which can profitably use additional funds for labor and materials, that they communicate with the local loan agency of this Corporation serving the territory in which such concerns are located.

News Items

Plan for Settlement of Labor Disputes

According to an announcement made recently by George L. Berry, NRA Division Administrator in charge of the Construction Code, a plan for settlement of labor disputes between building trades unions covering all possible controversies which may arise between trade unions has been worked out.

It is anticipated that this new program will eliminate much of the lost time which takes place when disputes arise between the unions.

Mr. Berry announces that—"An agreement has been signed by all the international building trades unions affiliated with the American Federation of Labor to definitely settle all jurisdictional disputes through machinery that has been set up in the Planning and Adjustment Board of the Construction and Industry Code.

"The Planning and Adjustment Board, made up of an equal number of contractors and representatives of building trades organizations, with a disinterested chairman appointed by the President, offers the finest facilities for the rehabilitation of the building industry and the enlarged plans of the President for public works that has yet been conceived."

Pre-Fabricated Houses

Houses, Incorporated, is the name of an organization formed to correlate the efforts of various manufacturers of pre-fabricated houses. Architects and research engineers on the organization's staff will thoroughly test all types of pre-fabricated houses and will conduct experiments for their improvement. It is the intention of the organization through economies of mass production, mass distribution and long-time financing to create houses at values not obtainable under old methods of construction.

American Houses, Inc., was the first pre-fabricated house-manufacturing company to be affiliated with Houses, Incorporated. Production has been started and will be expanded as requirements develop. This company's line of houses range in price from \$10,000 downward. These prices will include all equipment, delivery and erection but will not include the lot or landscaping.

Single-Family Home Repairs Lead

Single-family homes are far in the lead in the Modernization Program of the Federal Housing Administration for repair, alteration or improvement of real property.

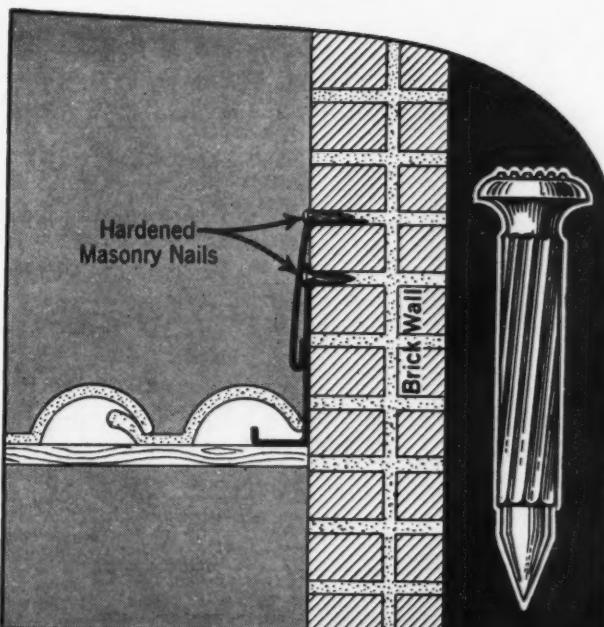
Estimates based on private and governmental surveys made throughout the country show that for every insured loaned dollar spent on modernization five cash dollars have been spent.

In the list of properties improved by the owner, loans on single-family homes amounted to \$13,181,376.41, or 69.87 percent of \$18,864,692.34; multiple-family homes, \$3,024,021.64, or 16.03 percent. Apartments, farm buildings and stores fell far below these figures, while there was just a "trace" of garages, factories and warehouses. Properties improved by the lessee totaled \$156,424.38, or slightly more than eight-tenths of one percent.

Modernize Main Street

With the appropriate slogan "Modernizing Main Street," the Industries Division of the Federal Housing Administration will soon launch a campaign to induce merchants of this country to lift the old faces of their stores and modernize the interiors with new fixtures.

According to the Industries Division, more than 750,000 stores need repairs. To encourage merchants to install new fronts, the Government is sponsoring a movement whereby merchants can borrow money on a five-year payment plan to improve the appearance of their property. The Division estimates that at least a \$2,000,000,000 market exists in this field and under the easy payment plan the merchant will spend considerably more than \$2500 for the improvement of his store.



CUTS Expenses on Masonry Fastenings

For use in Brick, Mortar, Concrete

Developed especially for the work, Hardened Masonry Nails save time, labor and money in making fastenings to brick, mortar, concrete or cinder blocks.

You drive these Nails into mortar and cinder blocks just as you drive common nails into wood. And, even in making fastenings to harder substances like brick and seasoned concrete you need to drill only a small starting hole. Nothing could be simpler.

Hardened Masonry Nails are cheaper to buy, as well as cheaper to use than ordinary devices such as expansion bolts, hooks and anchors. They make secure fastenings, too.

Mail the coupon for FREE SAMPLES. Give Masonry Nails a trial. See what they will save.



PRODUCT OF
PARKER-KALON
CORPORATION

Parker-Kalon Corp., 190 Varick St., New York, N. Y.
Send me free samples of Hardened Masonry Nails.

Name _____

Address _____

SOLD ONLY BY RECOGNIZED DISTRIBUTORS

YOU CAN BANK ON THE ARMCO DISTRIBUTOR



Thousands of sheet metal contractors enjoy dealing with Armco Distributors. They know there are ample stocks of Armco Sheets and Formed Products, to start with . . . Armco INGOT IRON, copper-bearing steel, or plain steel—gutters, downspouts, elbows—the right product for the job. No let-downs—always on-the-dot deliveries with a smile. Jobs go through on schedule; and they're done right with the *right kind* of sheet metal.

But the Armco Distributor offers you something more than prompt deliveries and close cooperation. He offers you sheet metals that your customers know and are glad to have you use. Remember, "Armco" is the most widely-advertised name on sheet metal . . . has been for twenty years. You capitalize on this name, this overwhelming public favor when you order *Armco Sheets* from your nearby Armco Distributor. And he has valuable, business-promoting helps to lay before you, too. Deal with the Armco Distributor.

THE AMERICAN ROLLING MILL COMPANY

Executive Offices: Middletown, Ohio



New Literature . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 59.

231—New Reference Manual on Air Conditioning

The Hart & Cooley Manufacturing Company have recently issued a very comprehensive reference manual of registers and grilles for air conditioning and ventilating installations. The manual is offered free of charge to engineers, architects and installers interested or engaged in making such installations.

While this book deals primarily with the register phase of air conditioning and ventilating, it contains a wealth of engineering data and graphic illustrations which are interesting and helpful in computing the requirements of every type of installation. ♦

232—Pulley Bulletin

A new leaflet, showing the line of steel V-pulleys manufactured by the Maurey Manufacturing Corporation, 2909 South Wabash Avenue, Chicago, contains sketches showing the construction of the pulleys accompanied by text covering the points of principal interest. Three pages of the leaflet are devoted to important information, such as price lists for all of the sizes of pulleys manufactured. Full tables of dimensions are also contained in the leaflet. ♦

233—New Furnace Leaflets

The Moncrief gas air conditioner is the subject of a new leaflet announced by the Henry Furnace & Foundry Company, Cleveland, Ohio. A large cut-away drawing shows the design of the gas furnace, the blower, filters and housings. Smaller sketches call particular attention to some of the details of design and construction of the furnace and the accessory apparatus. Full information is given on the principles of design and the operating results which can be obtained.

The second leaflet covers the Moncrief Series "B" gas furnace, a modern, efficient, moderate priced unit for gravity operation. Full explanation of the design and construction features are presented in the leaflet. ♦

234—Air Conditioning Leaflets

The Forest City Foundries Company, 2500 West 27th Street, Cleveland, Ohio, announces two new leaflets on the general subject of air conditioning.

The first leaflet shows a furnace and an assembled air conditioning unit for winter use with a question mark in between. The inside of the folder explains that winter air conditioning consists of automatic control of heat supply, cleaning, forced circulation, humidification, and air washing or cooling for summer use, if desired.

The second leaflet treats the subject of air conditioning in much the same way, but shows the Niagara line of coal-fired and gas-fired air conditioning furnaces. Full explanation is given for the furnace, blower, filters and controls. ♦

235—Air Cooling Sales Manual

International Engineering, Inc., Dayton, Ohio, announce a new sales manual entitled "International Air Cooling for Homes and Apartments, With Suggestions on Industrial Ventilation."

The first part of the booklet outlines the possible sales field; such as, public utilities, furnace contractors, sheet metal contractors and electrical contractors, who can logically sell air cooling.

A typical residence installation, showing a fan installed in the attic and the entrance of air through windows and out through the fan located in the attic, is presented in complete detail with information on how the system is designed and installed and the method of operation during various parts of the day.

Another section of the book gives a practical method for designing an air cooling system. Plans show the method of selecting locations for ceiling registers and locating the fan. Additional information is given on selecting the air change required, how to install the registers for a maximum air flow, and how to handle various construction features.

New Literature . . .

For your convenience in obtaining copies of New Literature, use the coupon on page 59.

236—Insulation Leaflet

Unifil, product of the Universal Insulation Company, 120 South LaSalle Street, Chicago, is described in detail in a small pamphlet which may be obtained from the company.

The leaflet explains how heat is wasted and how insulation properly applied reduces the heat waste. Savings of fuel during the heating season and cooler rooms during the summer season are explained fully.

237—Attic Ventilation Catalog

A catalog devoted to types of fans suitable for use in attic ventilation systems has been prepared by American Coolair Corporation, Jacksonville, Florida. The company manufactures a line of propeller type fans with blades of somewhat different design and arrangement; the fans are housed in frames or boxes ready for application in the building or cabinet.

Accompanying the illustrations are suggested applications of each particular type of fan. For example, the fan recommended for attic ventilation as an adjunct in summer cooling is shown with typical illustrations and information on the possibilities of cooling by attic ventilation. Suggested air changes for various industrial and commercial applications is typical of the type of text material presented.

238—Enduro 18-8

A new edition of the subject booklet, containing latest authentic data on the various members of the Enduro 18-8 family of stainless steels and including information on some of the newer stainless steel products, has been printed by Republic Steel Corporation, Massillon, Ohio.

An important feature of this illustrated booklet is a table showing the degree of corrosion-resistance exerted by Enduro stainless steel, types 18-8, S and AA in the presence of several hundred individual chemicals, solutions and other reagents.

Typical chapters covered by the book are: physical properties at high temperatures, methods of annealing, removing of scale, deep drawing, punching and shearing, riveting, welding, soldering, brazing and machining. Additional chapters cover the various specific types of stainless steels manufactured by the Republic Company.

The booklet is admirably illustrated with photographs showing typical products fabricated from various types of stainless steels. The recommendations for each type of operation on stainless steel are especially important in view of the fact that each section gives specific information on how the particular fabricating process should be handled to obtain the maximum benefits from the properties of the stainless steel sheets.

239—Low Priced Blower Leaflet

The Brundage Company, Kalamazoo, Michigan, announce a new leaflet describing and showing the company's new low-priced blower unit. Full explanation of the unit's construction and its housing, the proper method of connecting the unit to a furnace, explanation of installation features, etc., are presented in the text.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.,
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Check numbers in which you are interested):

116	117	118	119
120	121	122	123
231	232	233	234
235	236	237	238
239			

Name. Title.
Company.
Address.

Is Getting Business A Problem?

Here
Is
the
Answer . . .

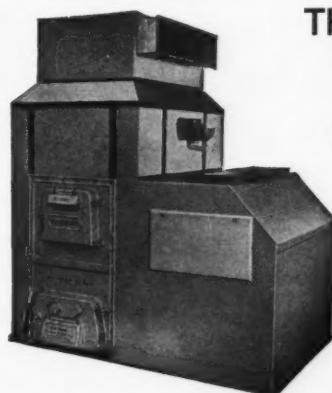


"SELLING IS TELLING," and here is a circular we have prepared to tell the spring furnace cleaning and furnace repair story for Moncrief Dealers. It is attractively illustrated, easy to read, and if you distribute a few hundred in your neighborhood, you will be kept busy this spring.

Send . . .

for sample, and circulars of Moncrief Air Conditioning Appliances for converting simple warm air furnaces into air conditioning systems.

The Henry Furnace & Foundry Co.
3473 E. 49th St.
CLEVELAND, OHIO



Moncrief
"Aristocrat"
Air Conditioner

MONCRIEF

Moncrief Furnaces
Cast—Steel

Moncrief "Aristocrat"
Air Conditioners

Moncrief Blower—
Filter Unit

Moncrief Gas
DeLuxe
Air Conditioners

Miles "Junior"
Air Conditioners

Moncrief
Automatic Humidifier

*Moncrief Pipe and Fittings
Everything for a warm air job*

Cincinnati Meeting

(Continued from page 14)

see that the permit has been taken out. New and replacement work fee is \$2.00; repair and resets are \$1.00.

M. F. Liebermann, Ambridge, Penna., reported that a committee from the dealers had met with a committee from the furnace manufacturers and that henceforth all mail order branch stores would be sold at a price based on each store's volume of sales rather than on the volume of the entire mail order company.

Addresses

A. F. Frazee, Dowagiac, Michigan, speaking on air conditioning said "Unfortunately the man who most needs the information available at this convention is not here. Right now we should be building 800,000 new homes every year. To this tremendous number of sales we should add another 800,000 replacements for 10-year old furnaces.

"Only lately have we begun to consider air as we have long con-

sidered pure water and pure food. We must educate the public to this idea. Air conditioning is attracting big business. We must watch our step or this business will slip away from us.

"Regarding the mail order business—the furnace manufacturers' code has established them as dealers. We can't fight them or legislate them out of business, but we can operate as intelligently as they do. Gip-jobbers and cut-price dealers are just as serious as the mail order houses. We can combat mail order competition by washing our windows, getting up a good display floor, offering price leaders, canvassing at the back door, using our satisfied customers—all ideas our company's survey has found to be job producing."

George Boeddener, Elyria, N. Y., discussing the mail order situation, cited Omaha, Nebraska, as an outstanding warm air and air conditioning city. Because of a good code dealers there do not know there is any mail order competition. Competitive condi-

tions have always and will always be with us; magnified today by conditions. What we need to do is to merchandise. He complimented the New York State Association for its fight against manufacturers selling mail order houses. "Mail order sales methods are not always outstanding," he declared, "and frequently depend for success upon price leaders, tricky advertising, but we, in turn, can advertise, merchandise, sell and get our share and more. We can even adopt automobile sales tactics and offer trade-in's for old furnaces."

Authority Election

The chief business of the Friday meeting was the election of the National Code Authority. In order that all delegates and proxy holders would be in attendance. The hour of election was set at 12 noon.

Walter Miller, Kansas City, Missouri, reported that the slate roofers have reached an understanding with the manufacturers

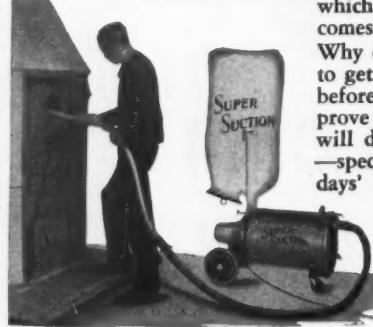
(Continued on page 62)

Try This Sure-Fire Way to Get Orders for New Furnaces, Parts and Repairs

The record shows that one Super furnace cleaner will sell more furnaces, resets, fire pots, smoke pipes, regulators, draft controls, grates, etc., than any two salesmen. And you pay the Super no salary or commission. Instead, it earns money for you over and above your profit on the new business it brings you. Actual records of Super owners show that they sell over \$1,000 worth of new furnaces and parts for every 100 furnaces they clean with the Super. They also get well paid for the cleaning. They sell a Super cleaning job first—which is easy. Then the rest comes easy.

Why don't you hire a Super to get business for you? Try before you buy. We will prove to you what the Super will do by sending you one—special tools and all—for 3 days' free trial at our risk.

Send for your Super now. This is your peak season. Let the Super show you how to make money.

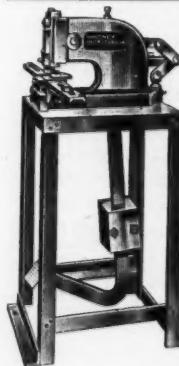


USE THIS COUPON

The National Super Service Company,
1944 No. 13th Street, Toledo, Ohio.

Send me a Super Suction Cleaner for free trial for 3 days after arrival.
 Tell me all about the Super and the free trial offer.

Name _____
Street and Address _____
City and State _____

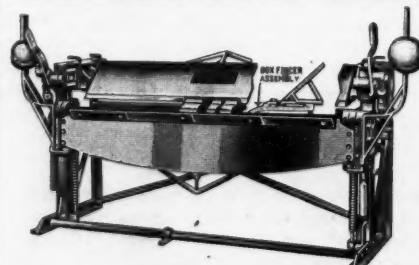


Foot Presses. Like all Whitney tools, this foot press is built to give a lifetime of good service. Expertly designed and made of the best materials throughout.

WHITNEY TOOLS



The Whitney No. 4 One-Piece Hollow Punch. Drop forged and containing a self-centering spring point. Can be furnished in sizes from $\frac{1}{8}$ " to $1\frac{1}{8}$ " by $\frac{1}{8}$ " variation.



Whitney-Jensen Combination Bending and Box Brake. Has 17 distinctive points of superiority. Write today for special descriptive leaflet fully illustrated.

The Whitney Metal Tool Company manufactures a complete and strictly quality line of tools. Of many hundreds of items which we

carry in stock, only a few can be shown in these advertisements. Always write us when you have a tool problem.

Whitney Metal Tool Co.
91 Forbes Street, Rockford, Illinois

With the Manufacturers

F. H. Mason Recovering

Francis H. Mason, Assistant Sales Manager of the American Air Filter Company, who was taken critically ill on the train while on a business trip between Minneapolis and Des Moines, has returned to his home in Louisville after seven weeks spent in a Des Moines hospital. Mr. Mason is still confined to his bed and it will be several weeks before he can be back at his desk.

R & B Dealers Informal "Get-Together"

A dinner was tendered to the Heating Contractors who attended the annual New York State Hardware Dealers Convention at Buffalo last month by Richardson & Boynton Company.

Approximately seventy-five guests sat down to dinner in the Chinese Room at the Statler Hotel, after which brief talks were given by members of the Richardson & Boynton organization. The F.H.A. plan and the possibilities it of-



ferred came in for a large share of discussion as did the importance and need for planned action into the immediate future.

"Air conditioning organizations entering the heating field are calling for aggressive dealer activity," it was pointed out. Such companies frequently enlist their new dealer organization from the present field of appliance, radio, electrical, or fuel dealers.

"Business all winter" was a subject that aroused the "prayer-meeting" instincts among many of those present—judging especially by those in agreement.

Mechanical Heating Schools

G. F. Goodall, Chicago Branch Manager, Williamson Heater Company, announces that he has arranged to stage two one-night schools in mechanical heating for the Iowa trade. The place and dates are as follows—Davenport, Iowa, April 22, 7:30 P. M. in the offices of the Crane Company, 217 East 2nd St.; Des Moines, Iowa, April 29, 7:30 P. M. at the L. A. Kurtz Co., 312 Walnut St. There will be no cost attached and anyone interested is invited.

Peerless Foundry to Be Distributors

Peerless Foundry Company, Indianapolis, Indiana, announce that the company has taken the distributorship of Front Rank steel furnaces for Indiana and Ohio. The Peerless Company will not handle the Liberty Foundry Company's line of cast furnaces.

Furnace Manufacturers' Code Amendment

Announcement is made that pursuant to Article V, Section 2 of the Code of Fair Competition for the Warm Air Furnace Manufacturing Industry, the NRA Administrator has approved an amendment whereby manufacturers of furnace parts are also included under the Code for the Manufacturers of Furnaces, both cast and steel.

Republic Steel Corp. Joins Seal of Quality Licenses

The Republic Steel Corporation has just signed an agreement to make and sell "Seal of Quality" 2-ounce coated galvanized sheets under the standard license issued by the American Zinc Institute.

SALT WATER Holds No Terrors for GOHI



U. S. Lighthouse Dept.
Engineers

John H. Simonds Co.
Contractors

IN the erection of this warehouse, owned by the United States Government Lighthouse Service, 16-Gauge GOHI Pure Iron-Copper Alloy Galvanized Sheets were used. Located on government property at South Portland, Maine, *on salt water*, this new building adds its evidence to the value of GOHI as the outstanding sheet metal, particularly where unusual conditions of wear, weather, and corrosion must be overcome.

The *extra* margin of safety, the *extra* years of life, and the *extra* performance engineered into Gohi Sheet Metal make it the logical choice for all sheet metal construction.

GOHI Pure Iron-Copper Alloy, measured by the most exacting standard of excellence, is the finest, longest-lasting, low-cost ferrous metal you can use.



GOHI Pure Iron-Copper Alloy is produced exclusively by The Newport Rolling Mill Co., Newport, Ky.

GOHI
PRONOUNCED GO-HIGH SHEET METAL
THE NEWPORT ROLLING MILL COMPANY NEWPORT, KENTUCKY

Cincinnati Meeting

(Continued from page 60)

whereunder only recognized contractors will be considered sources of distribution.

A. E. Klunder, Chicago, reported that at the built-up and roll roofing meeting the group entered a protest against the recent announcement of discontinuance of 32-inch roll roofing. The manufacturers are trying to substitute 36-inch. The contractors think the 32-inch is hazardous enough.

Ralph E. Dougherty, Deputy Administrator from Washington, N.R.A.'s representative at the election, reviewed some of the labor provisions and emphasized the importance of a clear, simply worded labor agreement. He explained that in determining a firm's proportionate share of assessment the dollar volume of business must be broken into the several activities such as roofing, re-roofing, sheet metal, etc. Then, in arriving at the total voting strength of all shops these columns are added up and each firm

is entitled to as many votes as its amount of work in each activity bears to the total amount of such work done in the community.

W. Roy Eichberg, Philadelphia, asked if during the rush season when interrupted by inclement weather mechanics can work their 40 hours, but work them on Sundays and overtime. Mr. Dougherty said no, if worked overtime we must pay time and one-half.

At this point N. E. Tobin, New York, of the re-roofers secured the floor and presented a resolution protesting the conference and election as discriminatory and not truly representative of the industry; as not possessing a sufficient number of legal votes to prove its true representativeness and in explanation declared that the re-roofers never wanted to be included under this code. He further declared that the re-roofers have no voice in the management and that if the filing of non-competitive bids is forced upon the re-roofers they will withdraw absolutely.

J. A. Miedema, Chicago, declaring that he represented many thousands of small furnace dealers all over the country, as well as Cook County, Illinois, and an Illinois state association, asked the resignation of Executive Manager Hays and asked the chair for the name of some individual in Washington who is or was responsible for the ruling that only those who have paid their assessment can vote. Chairman Griffiths replied that this is a uniform N.R.A. ruling for all divisions of the construction industry and is no doing of division 7. Mr. Miedema stated that until the furnace men are duly recognized and given a voice they will pay no assessments and will continue to protest all division activity.

The proxy committee reported that the entire voting strength of the conference was 3,871 votes. Of this total 3,268 votes and proxies came from Zone 11 and were held by D. A. Jackson, Los Angeles, code committeeman from the zone. According to the prescribed rules each zone must present its selected nominee.

Paste on Back of 1c post card
mail to APOLLO CO., LaSalle, Illinois

Send us Information on an APOLLO Pre-Finished Metal that is suitable
for the following work:

- Kitchen tables, shelves, hoods
- Store fronts
- Restaurant kitchen work
- Theatre decoration
- Marquise, canopies
- Signs
- Show window display
-
-
-
-

Name
Street
City
Jobber's Name



F. O. B. Cincinnati
with Tools and Attachments.

This is the same high quality machine that is known to furnace dealers everywhere as the most powerful, one-man cleaner on the market. Built by practical furnace men.

Quantity production and large purchasing power enable us to make this sensationaly low price. Includes tools and attachments. Folder "A" mailed upon request.

We also manufacture the "Christie Giant" to operate from truck or yard.

Sold by Jobbers and Furnace Manufacturers. Write for names of those in your territory.

CHRISTIE CLEANER COMPANY
Division of The Cincinnati Sheet Metal & Roofing Co.
226-30 East Front St. Cincinnati, Ohio
Salesmen: A few choice territories still open.

Field Test House Number 1

(Continued from page 20)

General Comfort

It might as well be admitted here that insofar as register air temperature and general comfort tests were concerned, the system did not test according to calculations until changes were made. Practically every register was passing air from a few to as much as 50 degrees below the pre-calculated 140 degrees. The result of these low register air temperatures was that occupants were not comfortable.

Burner Nozzle

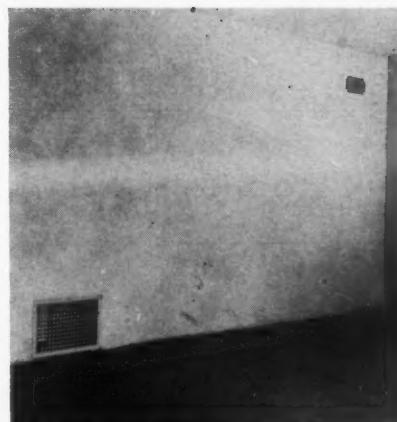
Check of the system at the time of the second field test, quickly disclosed that the oil burner flame, as viewed through the Pyrex door, showed off color. The door was unsealed, the burner shut down and the nozzle taken off. A one gallon tip was found. Such an amount of fuel burned could not possibly be sufficient to heat this house. A 3-

gallon tip was substituted and below zero weather found every register handling 140-degree air or above and the house comfortable in every corner.

C. F. M. Delivery

Attention is called to the special data sheet. Two lines give the picture of air delivery as shown by anemometer readings during the second field test. The top line shows the c.f.m. required to heat each room at 140-degree register air temperature during 10° below zero outside. Directly under this line is the anemometer reading for that room with the fan running and all duct dampers wide open.

Generally speaking, c.f.m.'s for first floor registers were found favorable excepting in the vestibule where at least as much or more air than called for was found necessary due to cracks around the outside door. This register and the



The basement game room is heated by side wall registers and baseboard returns. See data sheet and piping plan.

two registers under the living room windows (all off the same main branch) were found under volume. Check of the actual fittings compared with fittings specified disclosed that due to a partition and door into a basement shower room, the contractor had made some changes and seemingly upset air flow. Setting of dampers at the branching end of this main line brought up the c.f.m. to requirements.

Here is a furnace that makes "braggarts" of its users

12

SPECIAL FEATURES

- 1 Exclusive Processed Iron 30% to 50% Longer Life
- 2 One-piece cast radiator
- 3 Slip-on front
- 4 Extra deep ash pit
- 5 Duplex basket type grate
- 6 Feed door—large, air tight
- 7 Fire pot—lock-cup joints
- 8 Reinforced combustion chamber
- 9 Vapor pan—large, easy filling
- 10 One-piece base ring
- 11 Hot blast combustion
- 12 Simplified assembly—completely assembled and fitted at the factory

Here is a furnace that brings real, down-right enthusiasm from its users—its owners are inclined to be boastful when the subject of heating comes up.

Fuel consumption—ease of operation—extra capacity for the severe spell, Vernois owners can talk about real furnace satisfaction.

And you can wager that sort of a situation is pretty nice for the dealer who sells them. It is the kind of advertising that sends people into the store—that brings telephone tips that "so and so" is going to get a new furnace—you'd better see him."

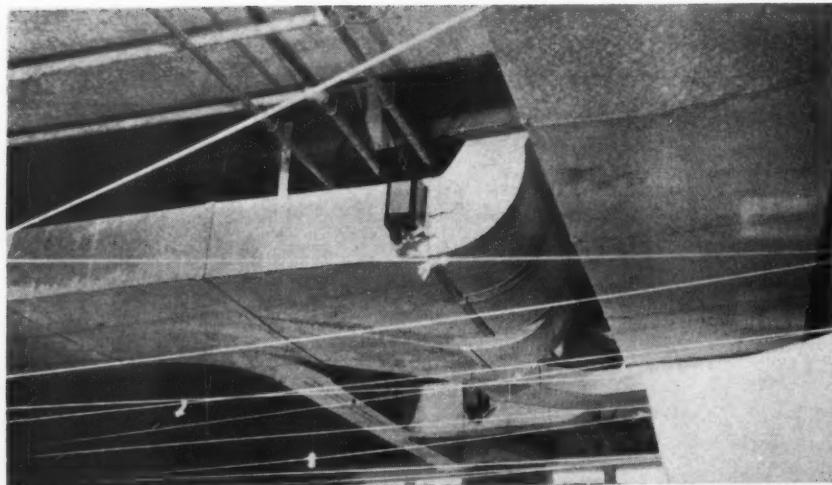
Look at those 12 features of the Vernois! It is a combination of all 12 that makes Vernois users regard it as they do.

If you'll write, we'd like to give you full details on the Vernois line. It is very much worth while for you.



MT. VERNON FURNACE & MANUFACTURING CO.

MT. VERNON, ILLINOIS



Two zone damper motors are shown here—also typical duct arrangements where zone leaders come off the plenum mains.

The sun room showed a deficiency of 100 c.f.m., which was rectified by choking down the basement recreation room and getting the additional 100 cubic feet.

It will be noted that second floor registers showed unders and overs about equally divided. By adjusting dampers these differences were leveled off; in the end getting just

about the air volume specified by the designer.

Control System

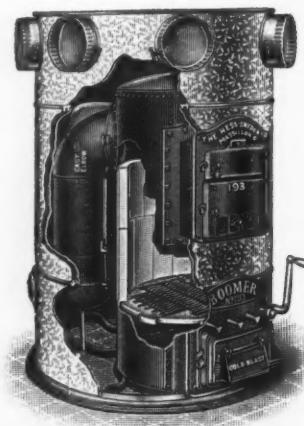
As mentioned, several difficulties were encountered with the control system. After the electrician's miswiring had been straightened out every thermostat-zone damper motor worked as specified excepting

the damper motor controlling the south end of the living room. During the second test these registers showed almost no air flow. A check of the motor showed incorrect wiring which kept the damper closed when the living room thermostat called for heat. The motor was rewired correctly and the zone thrown into operation.

The wiring for the control system was simplified by having a central panel containing binding posts and transformers. Thermostat cables could be run to the proper binding posts and connected; so, likewise, could the cable to the damper motor.

Bonnet Temperatures

One of the interesting discoveries of the second test was the difference in air temperatures between the front and back of the large single elbow off the furnace plenum. As indicated, the temperature (with the one-gallon nozzle) was 128 degrees at the front and 98 degrees at the back. This difference led to



Boomer Boiler Plate Furnaces

Also made with duplex grates and upright shaker.

Have been successfully made for 22 years. Where introduced have given satisfactory service. The fire pot liners are the best we can buy and we know of several Boomers that still have the original liners in, which are 22 years old. We have been making cast iron Boomers for 50 years.

If you are interested in selling a strictly high grade furnace, ask for prices and agency.

Nothing but the best of material enters into the making of Boomers.

When repairs are needed, avoid risk of dissatisfaction by ordering direct from the original patterns. Prices are low.

We sell to legitimate dealers only.

THE HESS-SNYDER CO., MFRS.

Massillon, Ohio

When in Buffalo

Enjoy the quiet of a fine hotel conveniently located to the business district yet away from downtown din. Meals that long remain a pleasant memory. Rooms that encourage rest. Rates \$1.50 to \$3.00 per day per person. Write for descriptive booklet and map of Buffalo.

HOTEL LENOX

140 North St.

Near Delaware

Clarence A. Miner
President



VIKING SHEARS

Viking shears are good shears. The name has come to stand for accuracy, reliability and good workmanship. They are rugged of design to withstand hard usage for years. Their positive action and clean cutting, together with perfect balance, make them a favorite in the shop and in the front office.

VIKING SHEAR CO. Erie, Pa.

PERFORATED METALS

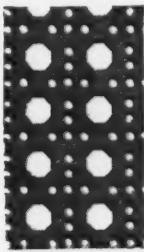
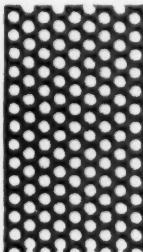
Brass, Bronze, Copper, Steel, Stainless Steel, Aluminum, Monel, Zinc, Tin Plate, Lead, or any other sheet material perforated to your order. Perforations in rounds, oblongs, squares and special shapes. Complete stock of brass and tin in small sizes.

Accurate, durable product. Send us your next specifications.

FOR
ARCHITECTURAL
GRILLES
RADIATOR
ENCLOSURES
SAFETY
GUARDS

And for all screening and sizing operations.

Prompt, careful work
Pleasing prices



The Harrington & King Co.
PERFORATING

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

WHITNEY

LEVER PUNCHES

No. 4B PUNCH



Length— $5\frac{1}{2}$ inches. Capacity— $\frac{1}{4}$ -inch through 10 gauge. Deep Throat—2 inches. Weight—3 pounds. Punches and Dies— $\frac{1}{8}$ " to $\frac{1}{4}$ " by 64ths.

No. 91 PUNCH

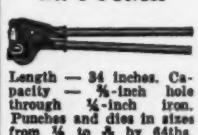


No. 8 PUNCH



Length— $28\frac{1}{2}$ inches. Capacity— $\frac{1}{4}$ -inch hole through $\frac{1}{8}$ -inch iron; especially adapted for button punching or template work. Punches and Dies— $\frac{1}{8}$ " to $\frac{1}{4}$ " by 32nds.

No. 1 PUNCH



Length— 34 inches. Capacity— $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. Punches and Dies in sizes from $\frac{1}{8}$ to $\frac{1}{4}$ by 64ths.

No. 2 PUNCH



Length— 23 inches. Capacity— $\frac{1}{8}$ -inch hole through $\frac{1}{4}$ -inch iron. Punches and Dies in sizes $\frac{1}{8}$ -inch to $\frac{1}{4}$ -inch by 64ths.

CHANNEL IRON PUNCH



Companion to No. 2 Punch. Every part of the two Punches Interchangeable, including punches and dies. Capacity— $\frac{1}{4}$ -inch hole through $\frac{1}{4}$ -inch iron.

We have tools for every purpose needed by Sheet Metal Contractors.

Ask your Jobber



W.H. WHITNEY MFG. CO.
636 RACE ST. ROCKFORD, ILL.

YOU ARE INTERESTED in A PLAN TO INCREASE YOUR SALES

that will work with your set-up in business. We have it and it actually works. . . . The plan has been developed through actual practice and is past the point of theory.

The Grand Rapids Furnace Cleaner is powerful, portable, and reasonably priced. Hard usage in the field has proven it to be durable.



OUR FREE TRIAL OFFER . . .

with no strings attached—will prove these statements to you.

YOU ARE THE JUDGE . . .

and then if you like the machine and our plan works for you—purchase can be arranged on—

CONVENIENT TERMS.

Write for details.

GRAND RAPIDS FURNACE CLEANER CO.
Grand Rapids, Michigan

LIBERTY

LIBERTY makes two complete lines of furnaces. The MELLOW line is cast iron. The FRONT RANK line is steel. Dealers representing these lines are at an obvious advantage. Write today for complete details.

CAST IRON FURNACES



STEEL FURNACES

LIBERTY FOUNDRY CO.

SAINT LOUIS

88-degree air at the south living room zone damper as against 120 and 114-degree air at approximately equal distances out in the two other main runs. As explained previously, this whole range of temperature was much too low, but the wide difference demanded an answer.

A check of the fan, fan-furnace connection and casing led to the conclusion that the large fan was blowing air into the casing and hitting the ashpit (this is a small horizontal furnace) and perhaps bouncing the air into the front two ducts. The contractor subsequently installed a sheet iron baffle in the rear of the furnace which directs the air into the back duct. Later temperature tests at the same locations showed air within four degrees of a common reading.

Temperature Drop

The basement piping plan shows five locations at which duct air temperature readings were taken to record temperature drop. Stations

A and B are as close to the plenum as possible and showed the variance mentioned previously. The inside casing baffle rectified this difference. Stations C, D and E indicate a fact which ought always be kept in mind—that air flows most freely through straight-out leaders. In this case Station D showed little temperature drop from the average of A and B. Readings taken simultaneously at stations C and E showed a 10-degree drop at E and a 6-degree drop from D to C. The low temperature shown at station E accounts for the decided feeling of chill found in the south end of the living room.

Data Sheet

The data sheet shows the final register air temperatures. These recordings should be compared with readings at stations C, D and E to find what happens after air leaves the basement ducts. So far as possible the bonnet air temperature was kept constant during the time the

register air temperatures were being read.

With the test apparatus available little data could be gathered on the flow of air up glass areas. The personal comfort feeling was satisfactory and some crude smoke tests showed that air issuing from registers did tend to float upward. Even with the low register air temperatures recorded a person could approach the windows without encountering bodily radiation sufficient to give a sense of chill.

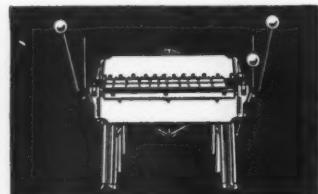
Conclusions

It is felt that the field test demonstrated a few important facts.

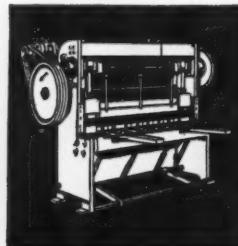
1. A duct system can be designed and sized to deliver practically the c.f.m. specified. Balancing changes need not be large and such a design insures ability to properly balance delivery at all registers.

2. Zone control systems are to be recommended for large houses; houses requiring different temperature ranges throughout the rooms. Wiring diagrams must be simple as

CHICAGO



Box and Pan Brake



Power Squaring Shear

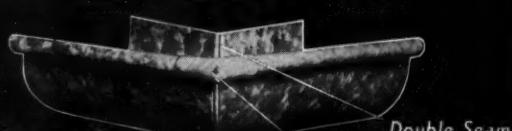
STEEL BRAKES—PRESSES—SHEARS

DREIS & KRUMP MFG. CO.

7404 LOOMIS BLVD.

CHICAGO

"BB" QUALITY



Quaker City
Mitre

WRITE FOR "BB" CATALOGUE

Order from your jobber

Mitres, conductor pipe, hangers, eaves trough,
caps, outlets, pipe hooks and fasteners

BERGER BROTHERS CO.

229-237 ARCH STREET, PHILADELPHIA, PA.

BETTER RESULTS

WITH
WALSH ASBESTOS
FURNACE CEMENT



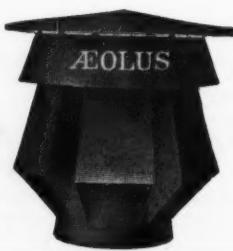
Use Walsh Asbestos Furnace Cement for certain and satisfactory results on all installation and repair work.

WALSH REFRactories CORP.
Producers of High Grade Refractories
for 50 years

4430 North First Street, St. Louis, Mo.

Walsh Asbestos Furnace Cement is furnished in 1, 2, 3, 5, 8 and 10 lb. cans; 25, 50, 100, 250, 500 lb. steel drums. We also manufacture Furnace Tile and Fire Brick.

Install **ÆOLUS**
Improved
VENTILATORS



FOR industrial buildings,
schools, homes, theaters, etc.
Made in 14 different metals.
Constant ventilation—no noise
—no upkeep.

ÆOLUS DICKINSON

Industrial Division of Paul Dickinson,
Inc.

3332-52 South Artesian Avenue
Chicago, Ill.

many systems are wired by local electricians who do not understand what such a system is supposed to do or how it operates.

3. Careful check of register air temperatures and register air velocities should be made in every case. The volume of air must be up to specifications and the temperature must be as high as specified or higher. It cannot safely be lower.

4. Temperature drop readings for questionable ducts should be made as a re-check on register temperatures and to determine if any assisting devices are necessary.

5. Comfort conditions should *not* be checked by assuming that specified register air temperatures and c.f.m.'s necessarily mean comfort. There may be areas within rooms which are not comfortable. Comfort should be secured by supplying the amount of air necessary to get comfort readings at various locations around each room.

Grave Vaults

(Continued from page 17)

follows—after a garment has been steam cleaned it is hung on the dryer and the fan turned on. The 900 c.f.m. of air from the fan is blown into the garment touching the hem first. Usually the hem is the last part of the dress to dry due to the fact that moisture drainage is downward. With this dryer the hem is dried first—thus saving many minutes in the drying process.

The cabinet type dryer has an inner shell assembled within an outer shell. Air from the fan enters the dress compartment through three perforated tube-shaped delivery tubes and leaves the cabinet through a perforated plate which forms the bottom of the inner shell. A small gas heater, a steam coil, or an electric heating unit warms the air. The air varies from 125 to 175 degrees as required. A damper is provided whereby part of the cab-

inet air may be recirculated if desired.

Cabinet Construction

The cabinet is made from galvanized iron of 26 gauge. An angle iron frame is first made and the sheets of the inner and outer shell are assembled and soldered. The illustrations show clearly the general design of the cabinet. The heat supply tubes are perforated and rolled in the shop and soldered into the inner shell. The cabinet is left unfinished on the inside, but is given a spray paint coat for the outside.

In addition to these interesting products, the Standard company has also established the fabrication of other products such as pipe, some cabinets and the usual line of architectural sheet metal products used in the building field. These latter products are made up on order or as a job materializes, whereas the specialties described formed a production process which can be worked into slack periods.

"I'd Rather Give Up My Whole Shop Than Give Up My Tornado Furnace Cleaner. Nothing Pays So Well!"

An energetic furnace dealer in South Dakota believes furnace cleaning service is the greatest aid to the sheet metal worker. He says, "Furnace cleaning gets you into homes that could never be approached by any other method." What an ideal plan for obtaining business under the F.H.A. plan and securing profitable repair and replacement business.

Keep step with the times and modernize your sales and service with the Tornado Furnace Cleaner—complete tools (chimney cleaner if desired), great power, more Tornado cleaners in use than any other type. Write for Free Trial offer.

Breuer Electric Mfg. Co.
865 Blackhawk Street, Chicago, Ill.

BETTER RESULTS!

can be obtained with the use of
GARDINER FLUX-FILLED SOLDER

Its high tensile strength insures clean permanent bonds—saves both time and material. Always ready for instant use.

Available in either acid or rosin core in various gauges.

Due to modern production methods Gardiner Solder costs less than ordinary solders.

We also make a complete line of bar, solid wire solders and babbitts.

Gardiner
METAL CO.

Flux-filled solder comes in 1, 5 and 20-lb. spools.

4831 So. Campbell Ave., Chicago, Ill.

RYERSON

IMMEDIATE SHIPMENT FROM STOCK

More than twenty kinds of prime quality sheets are carried in stock. There is a special sheet for every purpose. Also Bars, Angles, Rivets, Bolts, Tools and Metal-Working Machinery.

Write for Journal and Stock List

JOSEPH T. RYERSON & SON INC.

CHICAGO MILWAUKEE JERSEY CITY BUFFALO PHILADELPHIA

DETROIT ST. LOUIS CINCINNATI CLEVELAND BOSTON

SHEETS

ALL REPAIR PARTS for **FURNACES**
BOILERS
STOVES
RANGES

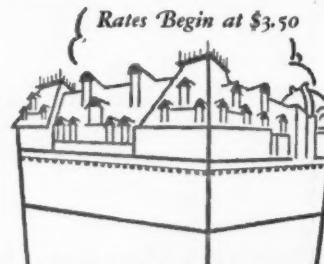
A.G. BRAUER
SUPPLY COMPANY

316 NO. THIRD ST. + SAINT LOUIS

IN STOCK • READY FOR IMMEDIATE SHIPMENT

Making
hospitality a very personal
consideration has made the
Bellevue, your home in
Philadelphia, one of the
World's best known hotels.

(Rates Begin at \$3.50)



BELLEVUE-STRATFORD



in Philadelphia

CLAUDE H. BENNETT, General Manager



ASSOCIATION

Once again the red and yellow glare of molten metal reflects against the night Pittsburgh sky. Experienced travellers recognize this sky coloring as typically Pittsburgh, just as they associate Pittsburgh and this fine hotel as the best address and largest hotel in Pennsylvania.

HOTEL WILLIAM PENN PITTSBURGH

GERALD P. O'NEILL, General Manager



CHICAGO'S MOST IDEAL LOCATION FOR EXHIBITS, MEETINGS, CONVENTIONS

Hotel Sherman has a tremendous appeal to the business man visiting Chicago because of its interest, its versatility, its splendid central location, its fine food and its moderate rates.

Conventions and meetings of any size—whether large or small—find unusual features at Hotel Sherman. Available in the Exhibition Hall on the Mezzanine Floor are 39,000 square feet of exhibit space. Full details on request.

1700 ROOMS FROM \$2.50

HOTEL SHERMAN

Why be satisfied with
an Ordinary Hotel?

THE PONTCHARTRAIN

offers more in comfort,
convenience & economy

• Whether you visit New Orleans for a day, a week, a month, or a year, you will find at the Pontchartrain everything expected of a fine hotel with added facilities you are sure to appreciate.

RATES FROM \$3

• The smallest unit is a living room with comfortable twin door beds, and a large dressing room, kitchenette with Frigidaire and bath with tub and shower. Rates include complete hotel service. A really superior Dining Room and the Fountain Room, serve excellent food at moderate prices.



ON BEAUTIFUL ST. CHARLES AVE.

NEW ORLEANS

LOUISIANA

CLASSIFIED ADVERTISING

4 cents for each word including heading and address. Count seven words for keyed address. Minimum \$1.00 for each insertion. One inch \$3.00. Cash must accompany order. Copy should reach us eight days in advance of publication date. Display rates for this page will be furnished on request.

SITUATIONS WANTED

SALES PROMOTIONAL ENGINEER, technical engineering graduate, wide wholesaler, distributor and architectural acquaintance. Territory national, preference west of Chicago to Coast. Pioneer in *air conditioning*; twenty years in plumbing and heating industry, including copper radiation, unit heaters and ventilation, both jobbing and manufacturing branches. Desires connection with manufacturer for direct sales or sales promotional work. Highest grade credentials. Salary or salary and bonus. Address Key 318, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

SITUATION WANTED BY SHEET METAL worker. Experienced in shop work and all outside work. Am also an experienced plumber and steamfitter. Address Key 314, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

SITUATIONS OPEN

REPRESENTATIVE WANTED — MANUFACTURER of complete line of warm air furnaces, boilers, air conditioners, and water heating equipment has open territories in Wisconsin, Indiana, and Ohio, also St. Louis district. Liberal commission basis. Address Key 317, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

WANTED TO BUY

WANTED TO BUY: FURNACE VACUUM cleaner; preferably Kent or other concealed bag type. Write giving best cash price, condition and list of attachments. A. W. Glawe, Inc., 7528 W. State St., Wauwatosa, Wisconsin.

WANTED: FURNACE CLEANING OUT-fit in good condition to be sent on approval. Quote price. Wade Sheet Metal Works, Yakima, Washington.

FOR SALE

FOR SALE: A GOOD SHEET METAL and furnace business, in town of 2,000. A real good business for the right man. Good reason for selling. Address Key 308, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

AIR-O-VAC FURNACE CLEANERS, strongest portable built. Has 34-inch water lift. Complete with necessary tools. 110 V AC, DC electric. Cheap. New, proven good by test. Write Air-O-Vac, Room 206-B, 1225 West Mitchell Street, Milwaukee, Wisconsin.

FOR SALE: 1 30" NIAGARA ADJUST-able bar folder. 1 2"x31" Forming rolls. 1 No. 4 Beading Machine. 1 Niagara small burr machine. Address Key 313, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

FOR SALE: PLUMBING, HEATING, REpair and Tin Shop—one of the best in state. Doing good business. Only shop in town. Must sell on account of age and poor health. Address Key 316, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

JOHNSON'S NEW HANDY MANUAL on HEATING, VENTILATING MECHANICAL REFRIGERATION and AIR CONDITIONING

Just off the press, with 432 pages of practical, condensed information, tables, rules and diagrams.

Price \$1.00—Remit with order to
KEENEY PUBLISHING COMPANY
6 N. Michigan Ave., Chicago, Ill.

FOR SALE

SHEET METAL WORKING MACHINERY AND TOOLS

Rebuilt - Trade - In Machinery

Angle Iron Cutters	Grinders
Beading Machines	Punches
Bending Brakes	Shears
Bar Folders	Turners
Groovers	Rollers

Write for Stock List

MAPLEWOOD MACHINERY CO., Inc.
2634 Fullerton Avenue, Chicago, Ill.

1 42" FOOT POWER NIAGARA Shears, 8"-9"-10" four-piece Side Seam Elbow Blades, 9"-10"-12" Curved Blades for Casing Collars. 95% new. Address Key 312, "American Artisan," 6 North Michigan Avenue, Chicago, Illinois.

?

HAVE YOU A SHEET METAL PROBLEM: FORMING—BENDING—PUNCHING—SHEARING

WE HAVE A MACHINE FOR EACH OPERATION ON SHEET METAL

Your Inquiries Earnestly Solicited

WARD MACHINERY CO.
SPECIALISTS
MACHINES—TOOLS—SUPPLIES
FOR SHEET METALS
562 W. Washington Boulevard
CHICAGO, ILLINOIS

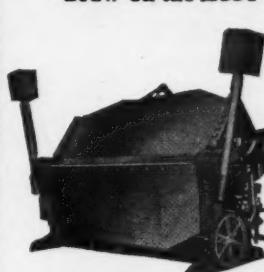
Patents and Trade Marks

Philip V. W. Peck

Barrister Bldg., Washington, D. C.

SHEET METAL MACHINERY

"Draw On the MOST COMPLETE STOCK IN AMERICA"



"A MACHINE FOR
EVERY
PURSE AND PURPOSE"

SOME REBUILT BARGAINS
Brakes, Chgo. St. Hand, 10'16; 10'14; 8'16; 8'18;
8'14; 6'16; 8'12; Power 3'10; 8'14".
Brakes, Box & Pan, 8' 10 ga. M. D.: 8 Ft. &
5' 14 ga.
Roll, 10'18 ga. Berthch Hand Slip: 36x1' Pexto

.....\$22.50

Ironworker, Poles, 4x2 1/2"; No. 2 Buffalo.

Press Brakes, 8' & 10' 10 ga. Ohl; 10' 3/4" L&N.

New 1/3 H.P. Handy Elec. Grinder B.B. \$25.00

Spot Welder, NEW capacity 2 pcs. 16 ga. \$125.00

50-Bench Kick Presses, each.....\$16.50

Circle Shear & Flanger No. 05 Nia. 18 ga. Will

flange 9-48" Hand and Power.

16-Brand New Rapid Kick Punches, 1/4"x10 ga.

6" throat, each.....\$45.00

Roller Die Machines, 3-8 spindles.

Gang Slitters, 30 to 36"; No. 2 Whitney Punch

.....\$8.50

Christie Furnace Cleaner Comp. w. motor \$100.00

Electric Drills (5) B. & D. 1/4" cap. each \$15.50

Send for Bulletin No. 835 listing modern requirements.

NEW ROLLS—SHEARS—BRAKES—PUNCH PRESSES

& BUTT, ARC & SPOT WELDERS—FOLDERS

PRESS BRAKES—HAND MACHINES—STAKES

DON'T Let Your
Surplus Machinery Stand Idle.
TRADE IT IN
On Interstate—
Guaranteed - Reconditioned Equipment.

We carry America's Largest
Stock Modern
Machinery at
prices that will
suit your bank
book. Let us
quote.

HAND
&
POWER

INTERSTATE MACHINERY COMPANY
130 S. Clinton St. - - - - - Chicago

Index to Advertisers

Firms represented in this issue are identified by the folio of the page on which their advertising appears. Advertising which appears in alternate issues is marked with an asterisk.

April, 1935

Acme Heating & Ventilating Co., Inc.	67	Gardiner Metal Co.	67	National Foundry and Furnace Co.	*
Aeolus Dickinson	66	General Electric Company.	26	National Super Service Co.	60
Air Controls, Inc., Division of The Cleveland Heater Co.	38	Globe Iron Roofing & Corrugating Co.	*	Newport Rolling Mill Co.	61
Allegheny Steel Co.	Back Cover	Grand Rapids Die & Tool Co.	42	Oakland Foundry Co.	*
American Air Filter Co., Inc.	*	Grand Rapids Furnace Cleaner Co.	65	Osborn Co., J. M. & L. A.	55
American Brass Co.	9	Harrington & King Perf. Co.	65	Owens-Illinois Glass Co.	*
American Radiator Company	45	Hart & Cooley Mfg. Co.	35	Parker-Kalon Corp.	56 and 57
American Rolling Mill Co., The	58	Henry Furnace & Foundry Co., The	59	Peerless Electric Co.	41
American Sheet and Tin Plate Co.	6	Hess-Snyder Co.	64	Peerless Foundry Co., Inc., The	39
Anchor Stove & Range Co., Inc.	40	Hess Warming & Ventilating Co.	41	Practical Instrument Co.	*
Apollo Company	62	Hotel Bellevue-Stratford	68	Randall Graphite Products Corp.	43
Auer Register Co.	*	Hotel Lenox	64	Republic Steel Corp.	Inside Front Cover
Automatic Humidifier Co.	43	Hotel Pontchartrain	68	Revere Copper & Brass, Inc.	*
Autovent Fan & Blower Co.	43	Hotel Sherman	68	Round Oak Co.	*
Barber Gas Burner Co., The	44	Hotel William Penn.	68	Ruby Chemical Co., The	*
Benson, Inc., Alexander R.	*	Hussey & Co., C. G.	*	Russell Electric Company	3
Berger Bros. Co.	66	Independent Register & Mfg. Co.	43	Ryerson & Son, Inc., Joseph T.	67
Bishop & Babcock Sales Co.	37	International Engineering, Inc.	42	Scott-Newcomb, Inc.	46
Brauer Supply Co., A. G.	67	Interstate Machinery Co.	69	Scoville Manufacturing Co.	*
Breuer Elec. Mfg. Co.	67	Lau Heating Service, Inc.	44	Stanley Works, Inc.	*
Brundage Company, The	*	Lennox Furnace Company, Inc., The	10	Supreme Electric Products Corp.	*
Buffalo Forge Company	24	Liberty Foundry Company	65	Swartwout Company, The	38
Canton Steel Ceiling Co.	*	Lincoln Electric Co., The	*	Torrington Mfg. Co., The	*
Christie Cleaner Co.	62	Link-Belt Company	39	Trane Company, The	36
Clarage Fan Co.	40	Marshall Furnace Co.	*	United States Air Conditioning Corp.	*
Cook Electric Co.	42	Maurey Manufacturing Corp.	44	U. S. Pressed Steel Products Co.	*
Dail Steel Products Steel Co.	44	Meyer & Bro. Co., F.	53	Victor Electric Products, Inc.	*
Detroit Lubricator Co.	25	Meyer Furnace Co.	Inside Back Cover	Viking Shear Co.	64
DeWitt Operated Hotels	*	Minneapolis-Honeywell Regulator Co.	41	Walsh Refractories Corp.	66
Dreis & Krump Mfg. Co.	66	Monarch Mfg. Works, Inc.	41	Waterloo Register Co., The	*
Eaglesfield Ventilator Co.	*	Morency-Van Buren Division, Scoville Mfg. Co.	*	White Mfg. Co.	39
Faultless Heater Corp.	*	Mt. Vernon Furnace & Mfg. Co.	63	Whitney Mfg. Co., W. A.	65
Firelands Manufacturing Co., The	*	Mueller Furnace Co., L. J.	7	Whitney Metal Tool Co.	60
Fireline Stove & Furnace Lin- ing Co.	8			Wickwire Spencer Steel Co.	*
Fox Furnace Co., The	5			Wise Furnace Co., The	*

THE MEYER FURNACE COMPANY LINE IS

Complete



WEIR Series A



THE WEIR Wood Burning Furnace.

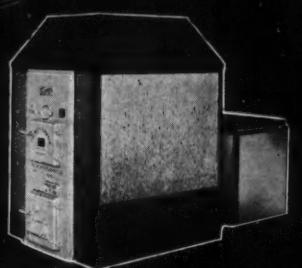


The WEIR Oil-Burning Furnace.



The WEIR De Luxe

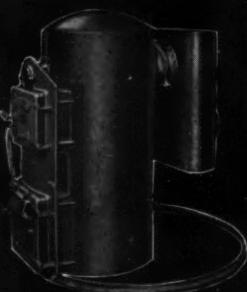
The MEYER Gas-Fired Air Conditioner.



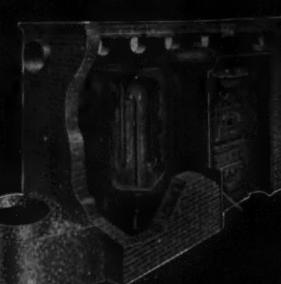
The WEIR Conditioned Air Unit



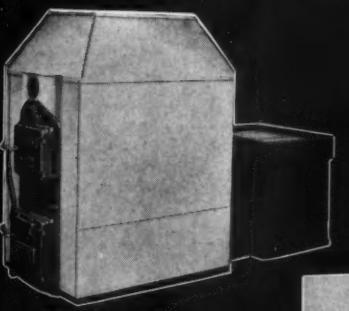
WEIR 600



WEIR Series M



The WEIR Brick-Set Furnace

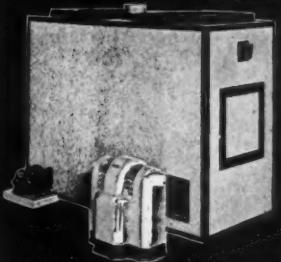


WEIR Series M Conditioned Air Unit

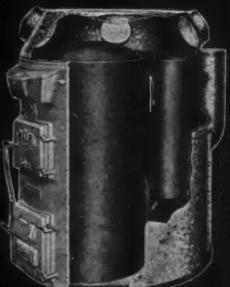
MEYER Washed Air Conditioner



MEYER Gas Furnace



WEIR Oil-Fired Air Conditioner



WEIR Series A



WEIR Series A DeLuxe

"Who Makes It Makes a Difference"

Pictured herewith are the products of a company whose business was organized and has been maintained for the sole purpose of supplying the best in heating equipment. Pioneers in the manufacture of steel warm air furnaces, The Meyer Furnace Company has devoted more than half a century exclusively to the development of highest efficiency and greatest convenience in heating, and, with the advent of air conditioning has held its position of leadership also in this comparatively new field. Moreover, this company is well-financed--is one of the soundest as well as one of the oldest in the entire industry--a fact that is extremely important to the homeowner.

"There is no substitute for experience"



THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

Get Our 1935 Proposition.
Send for Dealer Bulletin A-4.

ALLEGHENY METAL

*the time-tested
Stainless Steel!*

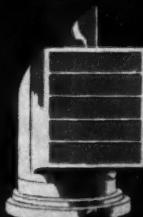
Real Profits!
and unlimited applications
for Sheet Metal contractors



ENTRANCES



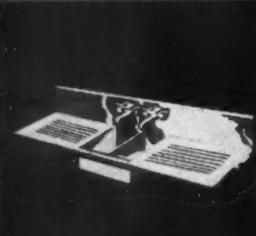
EXHAUST DUCTS



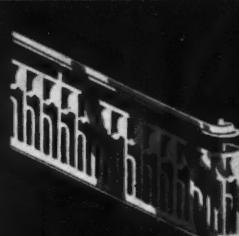
VENTILATORS



GRILLS



SINKS



RAILINGS



PORTABLE BARS



ORNAMENTALS



Allegeny
METAL

CONTROLS CORROSION

Since 1886

THE SAFE METAL

JUST A FEW
OF THE HUNDREDS
OF PRACTICAL
APPLICATIONS FOR
ALLEGHENY
STAINLESS STEELS

Ventilators
Kitchen Sinks
Grills
Ventilating Ducts
Window Displays
Metal Ornamentation
Smoke Pipe
Pilasters
Railings
Entrances
Exhaust Systems
Store Fronts & Fixtures
Vats, Tanks of All Kinds,
Etc., Etc.

Anything made of sheet metal can be profitably made of ALLEGHENY METAL . . . that beautiful, everlasting steel backed by a world-wide reputation for immunity to corrosion.

ALLEGHENY METAL is wonderfully ductile and easy to work—it can be cut, formed and welded into the most intricate shapes, and is available in any finish from dull to mirror bright. Both in building construction and equipment fabrication, this smooth, lustrous metal enables you to combine striking decorative effect with permanent corrosion resistance.

Do you have our bulletin "As the World Sees Allegeny Metal"?

ALLEGHENY STEEL
COMPANY . . . BRACKENRIDGE, PA.

Sales Offices and Warehouse Stocks in the Principal Cities; Stocks carried by
JOS. T. RYERSON & SON, INC. WAREHOUSES

Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston,
Philadelphia and Jersey City . . . Union Hardware & Metal Co., Los Angeles

(Allegeny Metal is manufactured pursuant to License from the Chemical
Foundation, Inc., under basic patents No. 1,316,817 and No. 1,339,378)